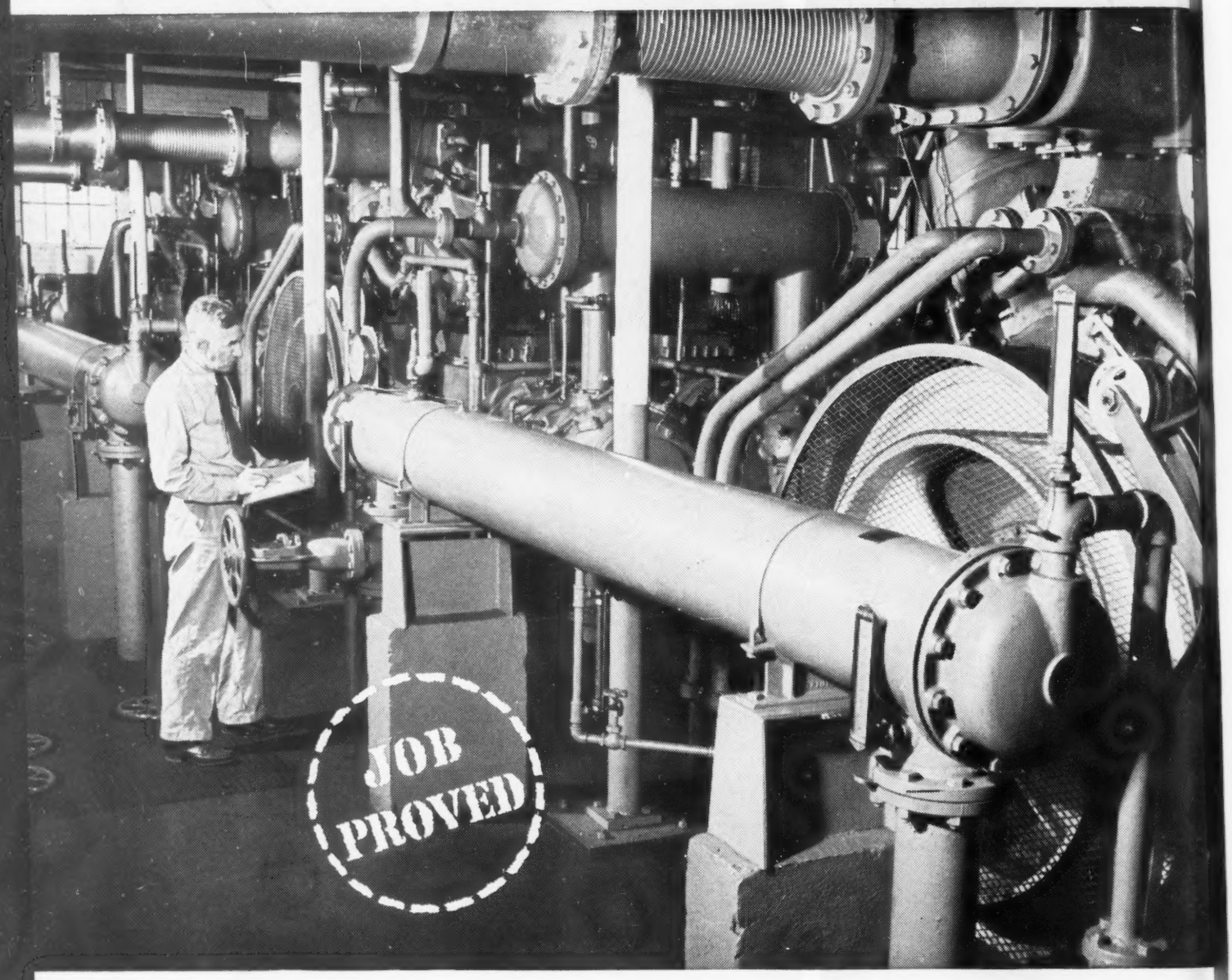
Coal Age

A McGRAW-HILL PUBLICATION

OCTOBER, 1947

TRAINING FOR COAL . . p. 74

Compressing Maintenance Problems



SUN COMPRESSOR LUBRICANT...

Keeps Compressors Operating Four Years on 24-Hour-a-Day Schedule

Twenty thousand and ten hours of trouble-free operation were piled up by one unit in a big, industrial plant operating a battery of heavy-duty 400 horsepower compressors. There was no time out except for routine inspections. Sun Oil was used from the very first hour these compressors were installed. When they were finally shut down for major overhauls, no wear was apparent and no major parts had to be replaced.

Sun "Job Proved" industrial lubricants are making similar impressive records in all kinds of industrial plants, keeping production on an even, round-the-clock basis, holding down maintenance and operating costs. If you have problems concerning the lubrication of compressors, power plants, machine tools or other industrial equipment — remember the Sun Engineer is at your service without obligation on your part. Just phone the nearest Sun office or write Dept. CA-10. . .

SUN OIL COMPANY · ***Philadelphia 3, Pa.***
In Canada: Sun Oil Company, Ltd.—Toronto and Montreal

SUN
SUNOCO
INDUSTRIAL
PRODUCTS

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OCT 17 1947
DETROIT

How water climbs a ladder

A typical example of B.F.Goodrich product improvement

AT SOME fires the water has to go high. Firemen have to draw hose up narrow ladders. And they have to do it in seconds.

Fire hose used to be heavy, bulky; it took too much strength and time to lift and carry; it wasted those precious seconds that often determine whether or not lives and property can be saved.

B.F.Goodrich, with more experience in fire hose design and making than any other company, set out to improve this old, standard product and came up with something almost completely new: a new way of twisting the cords to make them stronger; a new rubber compound that is lighter yet stronger, and lasts longer as well; a new way of weaving the cotton jacket that gives greater strength with smaller cords, and no weak spots; in fact, a new fire hose that is 18% lighter yet stronger than ever before; a hose that gets into action faster.

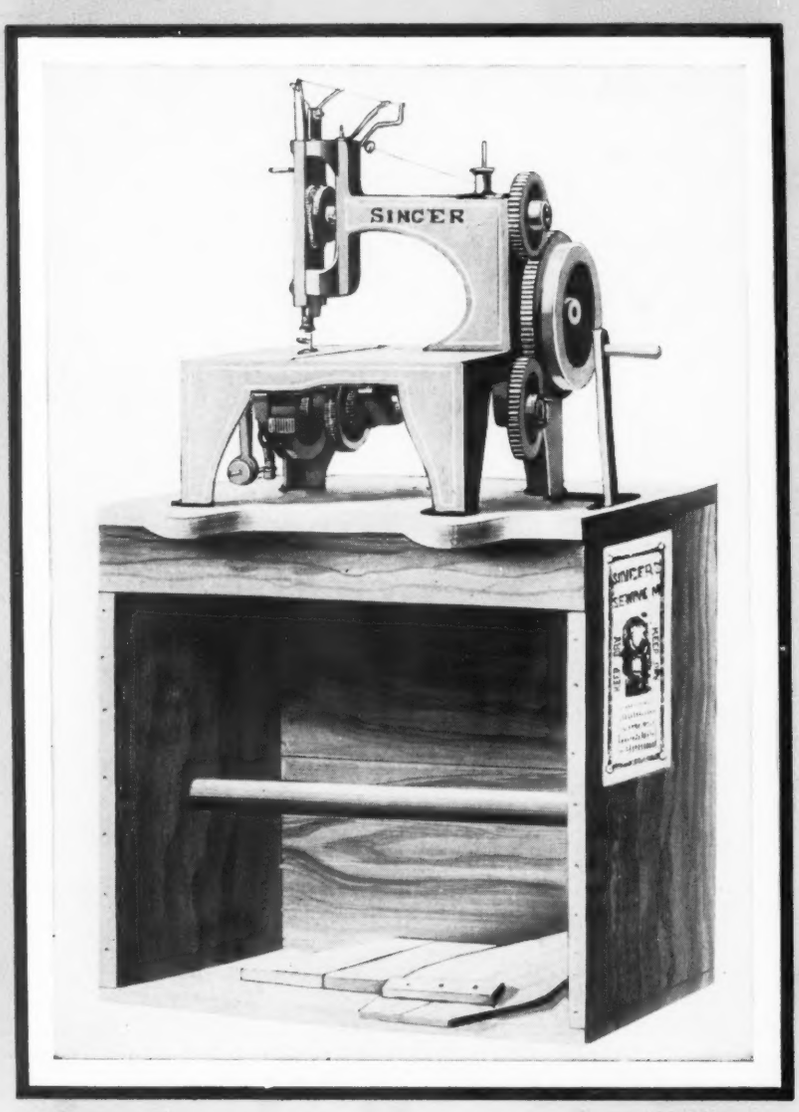
Just for good measure, they developed a new *Koroseal* gasket that can be tightened by hand — cuts coupling time in half, a new and stronger end construction near the coupling where failures used to be common, and a new treatment to prevent mildew.

This often happens at B.F.Goodrich when engineers set out to improve a "standard" product. That's why it pays to ask your distributor what new developments in rubber B.F.Goodrich has made lately in any products you may buy. *The B.F.Goodrich Company, Industrial Products Division, Akron, Ohio.*

Koroseal—Trade Mark Reg. U. S. Pat. Off.

B.F.Goodrich
FIRST IN RUBBER

First in its Field....



Courtesy Singer Sewing Machine Company

Mr. SINGER MADE IT FIRST...

but worked himself out of the patent!...

The first "modern" sewing machine with the rocking treadle was invented in 1851 by Isaac Merrit Singer. Not realizing he had made an important discovery, he failed to apply for a patent and was thunder-struck when a rival manufacturer informed him that, because he had failed to apply for a patent in two years of use, he was debarred from getting one! The Singer business commenced on a capital of $40 supplied by a friend – and is still growing!

Years ago some coal operators made an important discovery . . . the discovery that HULBURT QUALITY GREASE is the ONE grease that is made specifically for the PROPER lubrication of coal mining machinery. The use of HULBURT GREASE commenced in a small way—but QUALITY tells, and HULBURT preference is still growing! Down-in-the-mine Lubrication Engineering Service is another factor to help you when you use HULBURT QUALITY GREASE.

HULBURT OIL & GREASE COMPANY—PHILADELPHIA, PENNA.

Specialists in Coal Mine Lubrication

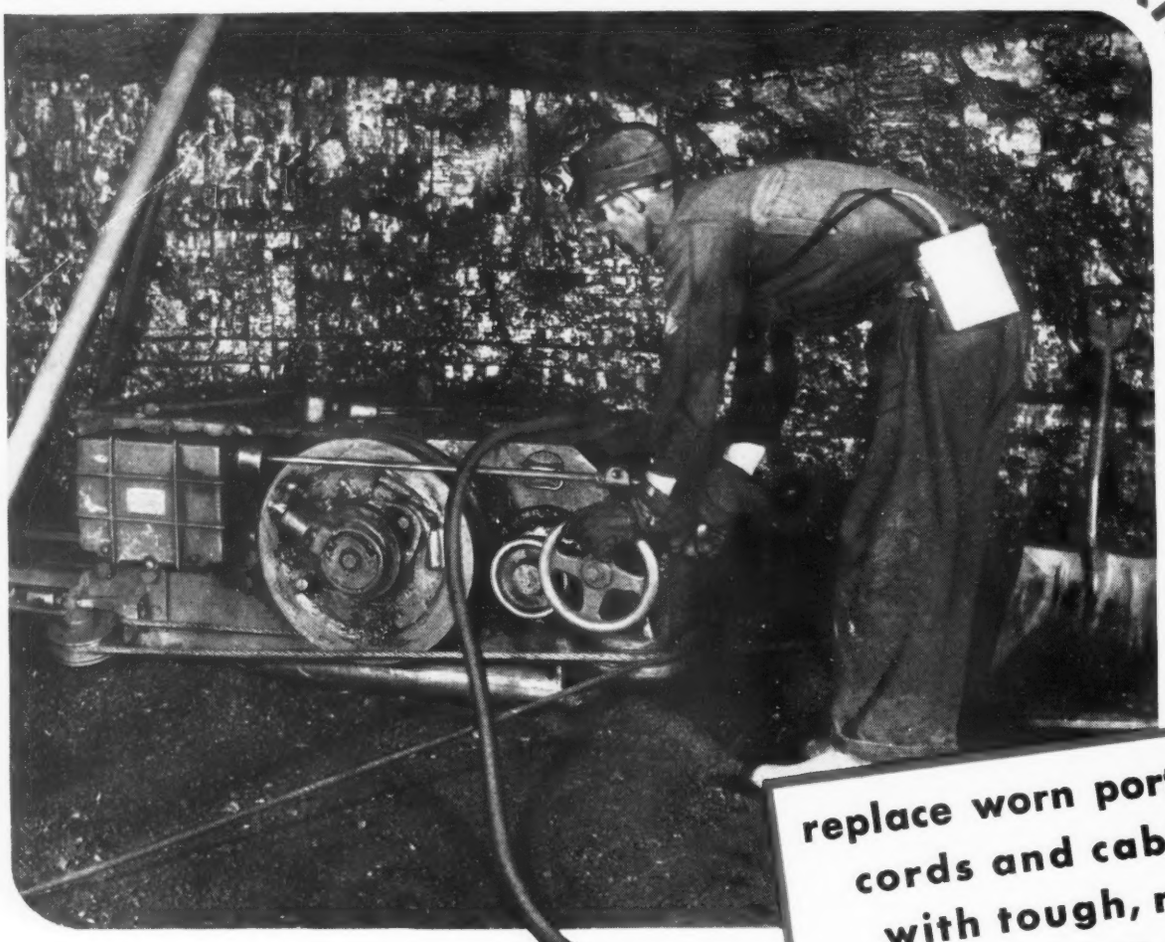
...a record of

American Leadership

HULBURT *Quality* GREASE

THE "FIRST NAME" IN

HOW TO PREVENT PRODUCTION LEAKS

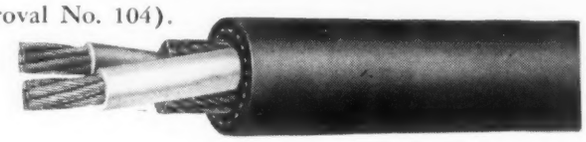


replace worn portable cords and cables with tough, new HAZACORD NOW

With the terrific punishment that most portable mining cables take daily, a check on their condition may uncover some "weak sisters" that should be replaced before they put a crimp in production.

Hazard offers you reasonably prompt delivery of that tough Hazacord portable cord and cable that has established such outstanding records in mine after mine for long, trouble-free service. For Hazacord portable cords — from the smallest to the largest — are pressure cured in continuous metal molds. It's this Hazard process that provides extra jacket density . . . extra surface smoothness . . . extra all around resistance to mechanical damage.

And all Hazacords are now furnished with a Hazaprene jacket that resists oil, grease, water, chemicals and flame (Penna. Bureau of Mines Approval No. 104). Your nearest Hazard representative will be glad to assist you in keeping electrical power flowing. Hazard Insulated Wire Works, Division of The Okonite Company, Wilkes-Barre, Penna.



5047

HAZARD

insulated wires and cables for every mining use

Coal Age

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Please change the address of my COAL AGE subscription as follows:

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Never consider your mine too "difficult" to enjoy the savings of high tonnage hauling!

WALTER TRACTOR TRUCKS haul 20 to 60 ton payloads

- *in good weather or bad*
- *on or off the road*
- *up steep and slippery grades*
- *with easy maneuvering*
- *and safe handling*

Left: WALTER TRACTOR TRUCK hauling 30-ton bottom dump coal trailer. 60 tons can be hauled by coupling two trailers together.

Above is shown the Walter 20-ton Dumper—a fast, compact, highly maneuverable unit for coal hauling or mine waste disposal. 200 hp. diesel engine.

COMBINING the speed of a truck and the traction of a crawler, Walter Tractor Trucks keep huge loads moving in running conditions that stop any other truck.

There's a sound and proven reason for this . . . the Walter 4-Point Positive Drive, with three patented automatic locking differentials. In this 100% traction four-wheel drive, power is constantly and automatically concentrated on the wheels having the most traction at any instant. Unfailing tractive power is available under all conditions.

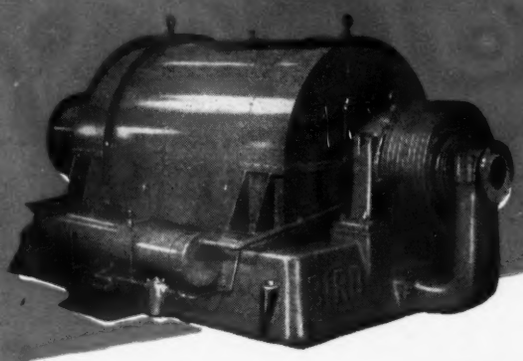
Write for detailed literature giving the full story of this feature and the many other engineering advances incorporated in Walter Tractor Trucks.

LONGER TIRE LIFE — LESS ROAD DAMAGE

With the Walter 4-Point Positive Drive, there is never wheel spinning to grind tires and gouge roads. Secondly, the Suspended Double Reduction Drive reduces unsprung weight, permitting tires to follow the contour of depressions and bumps without losing contact. This cuts down the bouncing, pounding and overheating of tires and is easy on mine roads. Many mines report substantial savings through this Walter feature.

WALTER TRACTOR TRUCKS

WALTER MOTOR TRUCK CO., 1001-19 Irving Ave., Ridgewood 27, Queens, L. I., N. Y.



This BIRD Filter separates the water from your washed fine coal just as it comes from your washing system.

The water is clean — so clean it can be used over and over.

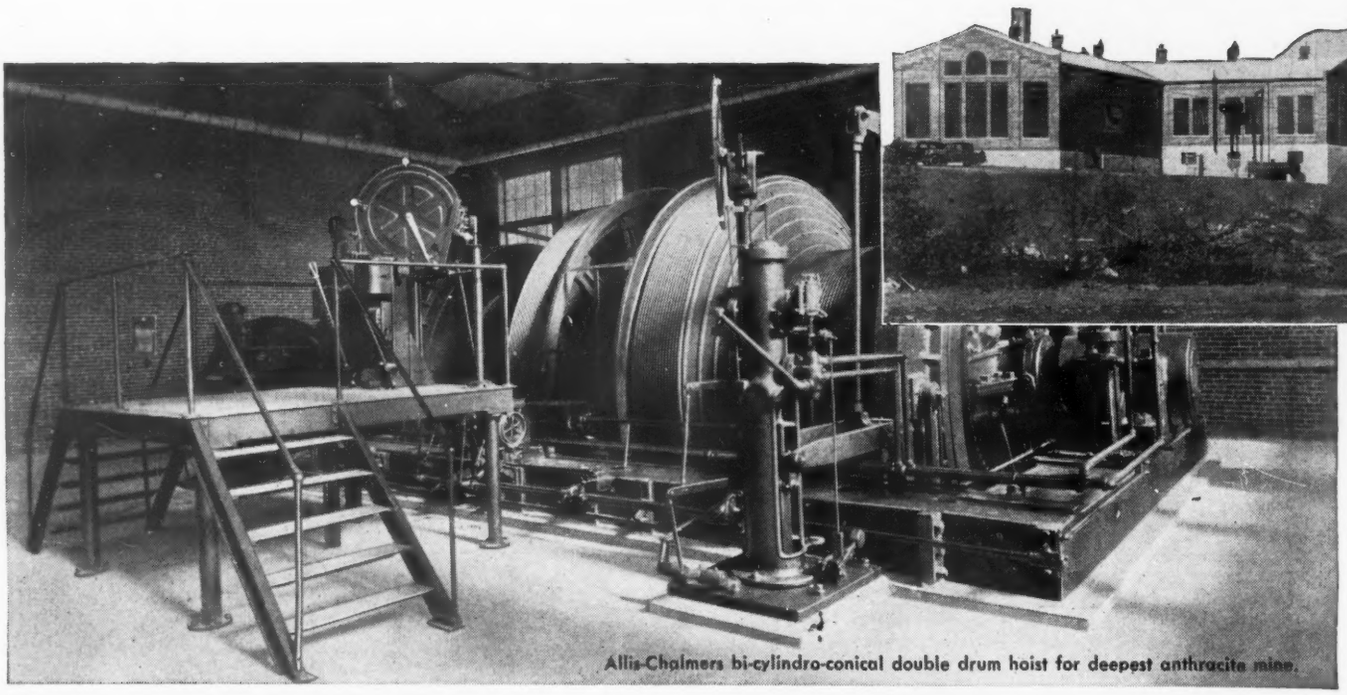
The coal is dry . . . all ready for blending.

The BIRD handles forty tons or more of fines per hour. It runs continuously with virtually no attention or maintenance.

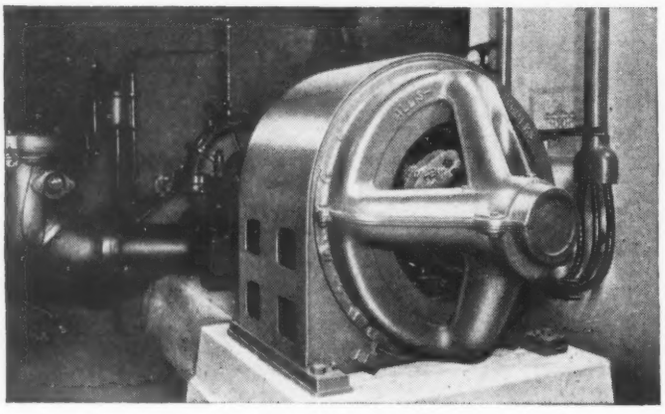
BIRD MACHINE COMPANY

SOUTH WALPOLE • MASSACHUSETTS

Hoisting Costs

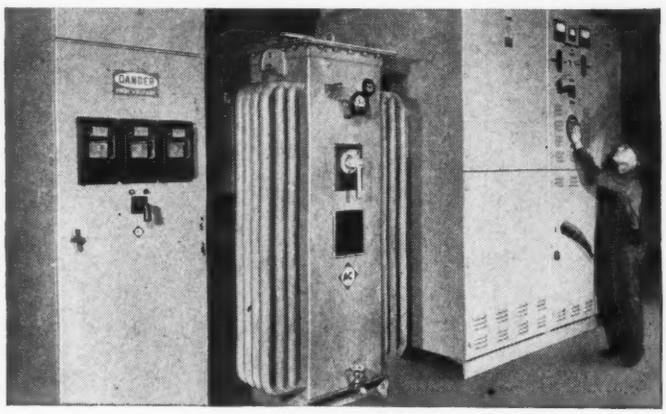


Allis-Chalmers bi-cylindro-conical double drum hoist for deepest anthracite mine.



POWER UTILIZATION

DEPENDABLE POWER for mine drainage is supplied by this 1,000 hp wound rotor induction motor which drives a 9,000 gpm; 360 ft head, single-stage pump in a large coal mine. Allis-Chalmers builds motors for *any* torque and hp requirements . . . with open, enclosed or splash-proof construction. Durability features, such as rigidly fabricated steel stator frame construction . . . statically and dynamically balanced rotors . . . liberally designed bearings and housings result in unusually long motor life.



POWER DISTRIBUTION

IT'S EASY TO INSTALL sealed tube type Excitron rectifiers. Each Excitron unit is completely factory assembled and wired for immediate connection to power supply. Excitron rectifiers have no major rotating parts . . . require minimum attention and maintenance . . . offer high overall power conversion efficiency for d-c voltage regulation over 250 volts. High power factor is almost constant under *all* load conditions. Simple, rugged Allis-Chalmers design means long tube life and thoroughly dependable service.

ALLIS-CHALMERS

One of the Big 3 in Electric Power Equipment — Biggest of All in Range of Industrial Products

Go Down ...JOB RECORDS SHOW

with Allis-Chalmers Electric Hoists and "Regulex" Control

THIS HOIST set a record for economical hoisting in the deepest U. S. anthracite mine . . . resulted in *new low kw per ton costs* for these conditions. Other *hundreds* of Allis-Chalmers hoists—in use throughout the world — prove the soundness of A-C engineering.

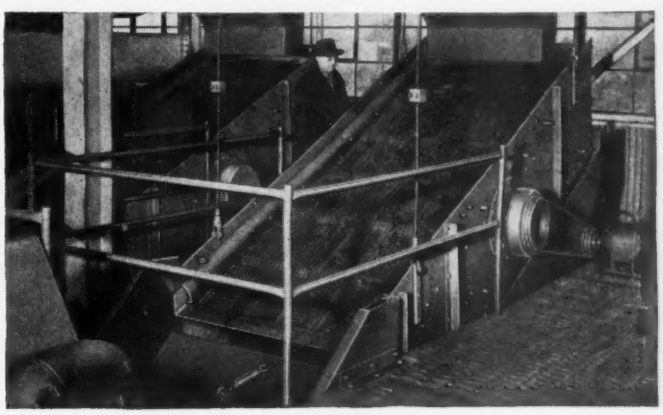
All Allis-Chalmers hoist designs are based on years of experience in working out *cost-lowering* solutions to hoisting problems. And hoisting is only one way in which Allis-Chalmers equipment engineering can help you get increased tonnage at lower cost.

Such products, for example, as the Solids-Handling Pump and the Low-Head Screen with End-Tensioned Deck for coal dewatering have been developed specifically for coal by Allis-Chalmers coal industry specialists.

Find out how Allis-Chalmers equipment can help *you* cut costs. Call the A-C office nearest you. ALLIS-CHALMERS, MILWAUKEE 1, WIS.

CENTRIFUGAL PUMPS

SAVE THREE WAYS with the compact Electrifugal, the Allis-Chalmers pump that costs less to buy . . . to install . . . to operate! Unit shown above is used to recirculate water for coal dewatering in a coal preparation plant. Pump and motor are combined in one "package" . . . Electrifugal pump occupies one-third less space than comparable pumps, and can operate in *any* position. Splash-proof construction. Single or double stage. Sizes ¾ to 25 hp; capacities to 1,600 gpm; heads to 500 ft. **Bulletin B6018.**



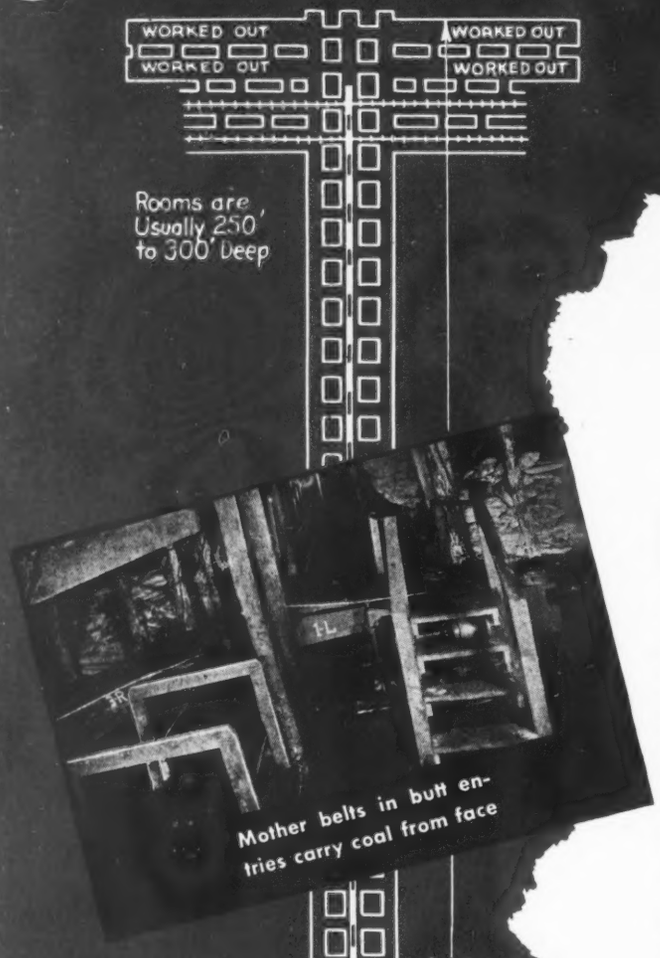
BASIC PROCESSING

CIRCLE THROW action of Riplo-Flo screens results in rapid stratification and more even bed depth of coal on screen, increasing screening capacity. Two 5 by 12 ft Ripl-Flo screens, above, classify washed coal in a large coal tipple. Two-bearing mechanism eliminates outer bearings and support frames . . . makes Ripl-Flo light in weight and low in power requirements . . . greatly reduces vibration. Welded parts "stress-relieved" for uniform, lasting strength. Sizes 3 by 6 to 6 by 16 ft. **Bulletin B6151B.** A 2228

1847 1947 A CENTURY OF SERVICE to Industry THAT MADE America Great

. . . builds for COAL

For long life, high tonnage underground


WORKED OUT
WORKED OUT
WORKED OUT
WORKED OUT
Rooms are Usually 250' to 300' Deep
Mother belts in butt entries carry coal from face
1500'-2500'
GOODYEAR INDUSTRIAL RUBBER PRODUCTS
-Specified Plan
for mine 100% conveyorized with Goodyear COAL-FLO Belting
ADVANCING
Grandmother belts in face entries carry coal to slope

IT IS well established that belt conveyors are the most efficient and economical method of hauling coal outby — just as long experience proves that Goodyear COAL-FLO belts are your best bet in conveyorizing, on both cost-per-ton and cost-per-year basis.

Best evidence of that is the fact that more mines are equipped with Goodyear COAL-FLO belting than any other brand — for these practical dollars and sense reasons:

1. IT IS LONG-LIVED — more than 90% of the hundreds of thousands of feet of COAL-FLO belting installed in mines is still in use, much of it with eight years or more service.

—records prove no belting equals

GOODYEAR

COAL-FLO

2. IT IS MILDEW-INHIBITED, ACID-RESISTING — COAL-FLO belts do not develop cancerous soft spots and carcass rot in mines where damp or acid water conditions are bad, because the carcass is protected by a special mildew inhibitor — because the cover and friction are compounded of tough, acid-neutralizing rubber.

3. IT IS JOB-FITTED — all COAL-FLO belts are specified to the job by the G.T.M. — Goodyear Technical Man — to assure proper troughing for maximum load-carrying capacity and correct, straightline training to prevent edge wear.

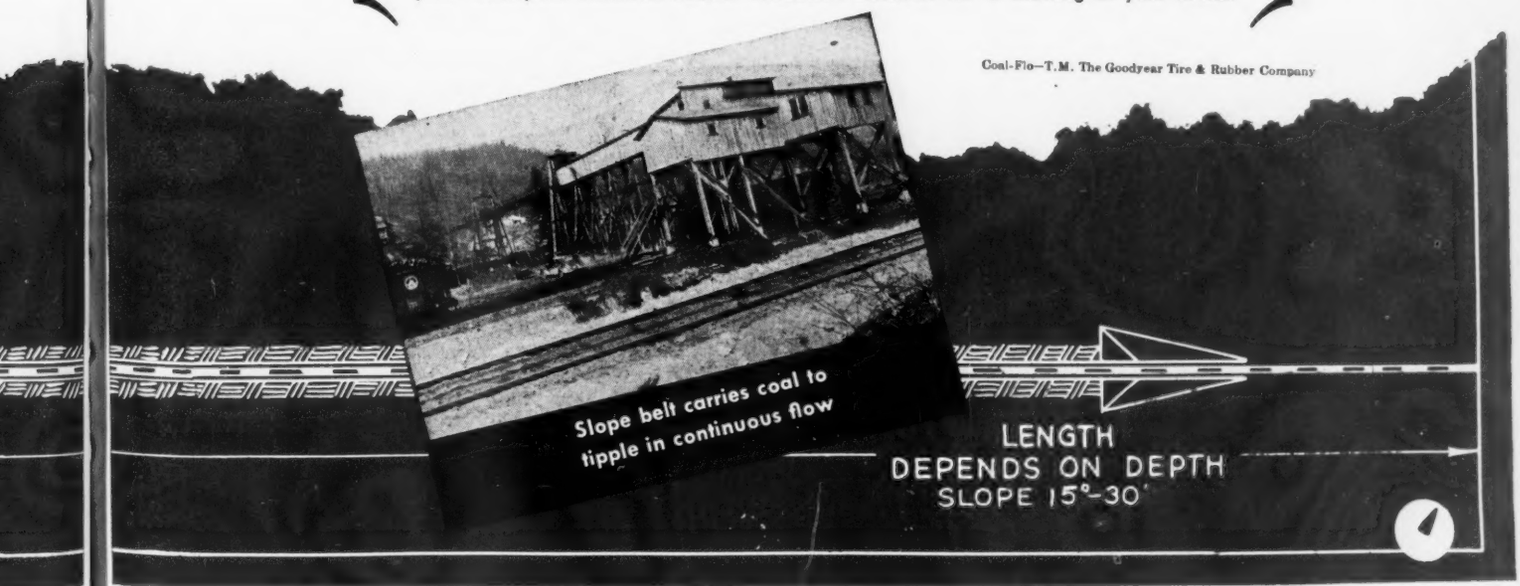
Next time you buy conveyor belting, buy by the record and you'll buy Goodyear COAL-FLO belts. The G.T.M. is ready to show you mine records proving important savings with this super-quality belting. To bring him to your office, write: Goodyear, Akron 16, Ohio or Los Angeles 54, California.

FOR HOSE, BELTS, PACKING, MOLDED GOODS and **TANK LINING** built to the world's highest standard of quality, phone your nearest Goodyear Industrial Rubber Products Distributor.

MORE TONS ARE HAULED ON GOODYEAR CONVEYOR BELTING THAN ON ANY OTHER KIND

LET US SHOW YOU—IN COLOR MOVIES

Goodyear's colorful, new sound motion picture, "THE WAY OUT," shows actual mine evidence of the many savings possible with COAL-FLO conveyor belting. Phone your Goodyear Industrial Rubber Products Distributor for a showing at your office.



Coal-Flo—T.M. The Goodyear Tire & Rubber Company

KEEP HYDRAULIC

Tune in . . .
TEXACO STAR THEATRE
presents the
TONY MARTIN SHOW
every Sunday night.
See newspaper for
time and station.

TEXACO
REG. T.M.

TEXACO LUBRICANTS

SYSTEMS CLEAN

...FREE FROM SLUDGE and RUST

YOUR hydraulic mechanisms will operate more smoothly – give you efficient trouble-free service longer – when you use *Texaco Regal Oils (R & O)*, the world-famous, turbine-grade oils that keep hydraulic systems *clean.*

Texaco Regal Oils (R & O) contain strong rust and oxidation inhibitors, and do not foam. They prevent formation of sludge and rust – thus eliminate the principal causes of hydraulic system stoppages.

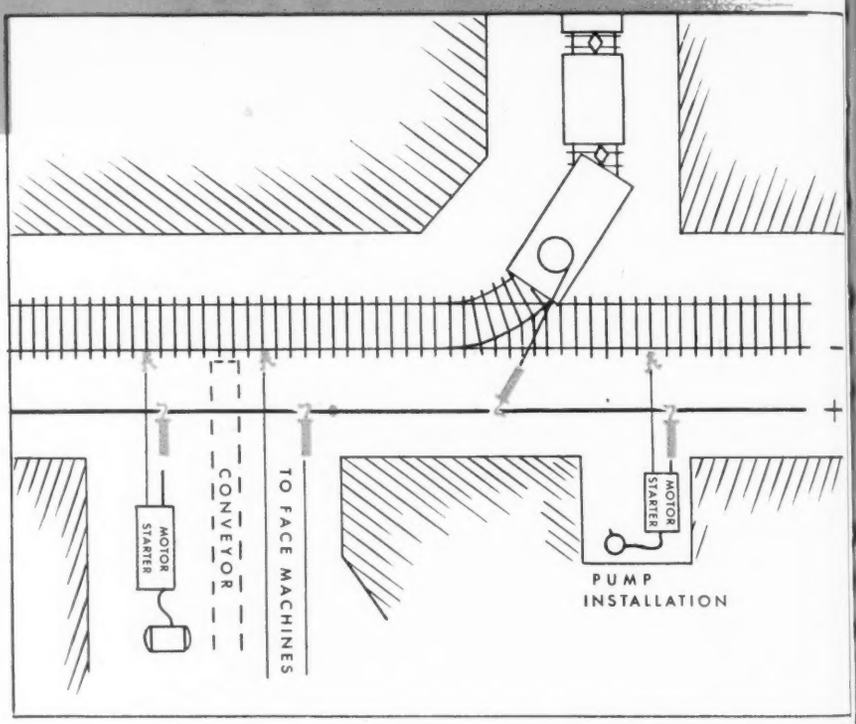
There are viscosities of *Texaco Regal Oils (R & O)* to assure efficient operation of hydraulic systems of every type and size. Leading makers of hydraulic equipment approve *Regal Oils (R & O).*

For Texaco Products and Lubrication Engineering Service, just call the nearest of the more than 2500 Texaco distributing plants in the 48 States, or write The Texas Company, *National Sales Division, Dept. C,* 135 East 42nd Street, New York 17, New York.

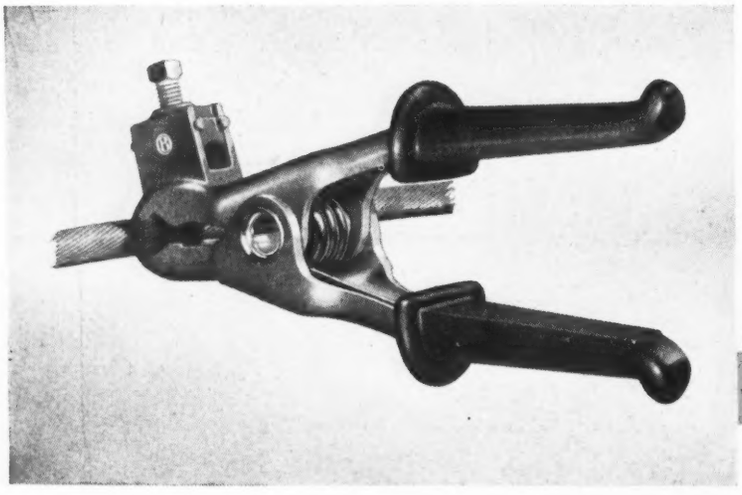
TEXACO MAINTENANCE LUBRICATION CHARTS. Leading manufacturers of underground mining machinery approve Texaco products for use on cutters, loaders, locomotives, etc., and have cooperated in preparing these charts. Charts show clearly where and when to use the proper lubricants. Order the charts you need by make and model of each machine.

For the Coal Mining Industry

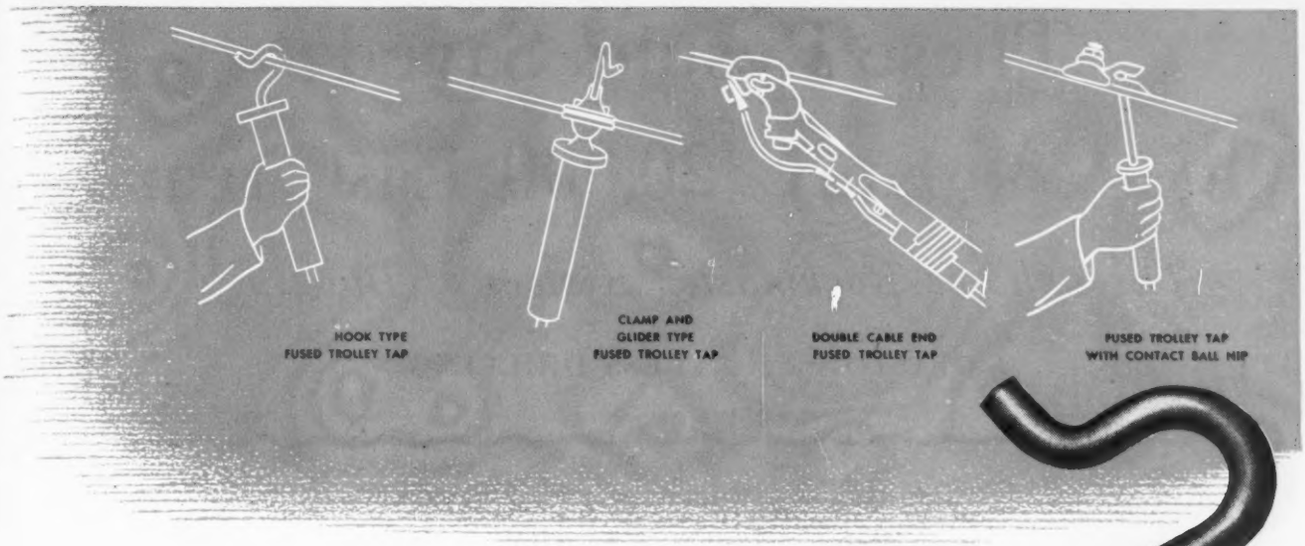
How to Stop MAKESHIFT POWER CONNECTIONS



....TIGHT GRIP OF PLIER-TYPE GROUND CLAMPS PREVENTS EXCESSIVE POWER LOSSES.... Ground connections can be a potential source of power loss—but not if you use O-B Plier-Type Ground Clamps. These sturdy devices provide a perfect mechanical and electrical connection. They may easily be attached to either bond cables, rail base or negative feeders as large as 1,000,000 circ. mils. Their strong, spring-kept jaws hold tight with a grip that is unaffected by twisting or vibration. Safe rubber handles protect the man making a connection.



Stop makeshift return circuit connections by installing Plier-Type Ground Clamps throughout your mine. They are available in two sizes to handle a wide range of cables. Order some today.



To Feeder...

FUSED TROLLEY

TAPS PUT SHORT CIRCUIT PROTECTION WHERE SHORT CIRCUIT PROTECTION BELONGS....

It costs but little to equip your mine with O-B Fused Trolley Taps. But the protection these simple connective devices bring is worth many times their original cost—mechanical protection against hazardous makeshift connections to the feeder system; fused protection against overload and burnout of both cables and machines. Why take chances? Safeguard your large investment in equipment, cables and time by connecting all trailing and machine cables to the feeder through O-B Fused Trolley Taps. There is a size and type to meet every condition. Fuses from 3 to 400 amperes can be handled. Four different end arrangements are available. For more complete data and ordering information, write for booklet 790M.

Ohio Brass

MANSFIELD, OHIO

Canadian Ohio Brass Co., Ltd., Niagara Falls, Ont.

These Results Saved
One Company $20,000 Last Year

Through the Rockmaster System of Blasting

MORE TONS..... LESS DRILLING

Before Using Rockmaster System

Type of stone	Hard limestone that tends to break large
Primary drilling	3 wagon drills
Layout	23′ deep, 4′ burden, 4′ centers, single line of holes
Maximum lbs. in shot	Not over 500 due to vibration (quarry is within city limits)
Secondary	5 jack hammers
Daily tonnage	850 tons

With Rockmaster System

Type of stone	Same
Primary drilling	2 wagon drills
Layout	23′ deep, 6′ burden, 8′ centers, 3 lines of holes
Maximum lbs. in shot	1500, and not as much vibration as in a 500-lb. shot when using ordinary blasting methods
Secondary drilling	1 jack hammer
Daily tonnage	1350 tons

"WE saved $20,000 in this one quarry last year by using the Rockmaster System," says this quarry owner!

Quarries, strip pits, mines and construction projects the country over are getting more profitable results from the Rockmaster System of blasting, an original Atlas development. The Rockmaster principle of milli-second delays between drill holes, coupled with proper choice of explosives and loading, has not only upped fragmentation of burden and increased production, but has also cut down on noise and vibration where these have been a difficult problem.

Can Rockmaster do as much for you as it did for the quarry man we quote? We don't know, but in all fairness to yourself, why not find out? Call in your Atlas representative, and he'll be glad to give you the facts about what *you* can expect from Rockmaster.

ROCKMASTER GIVES YOU THE GREATER SAFETY OF MANASITE DETONATORS

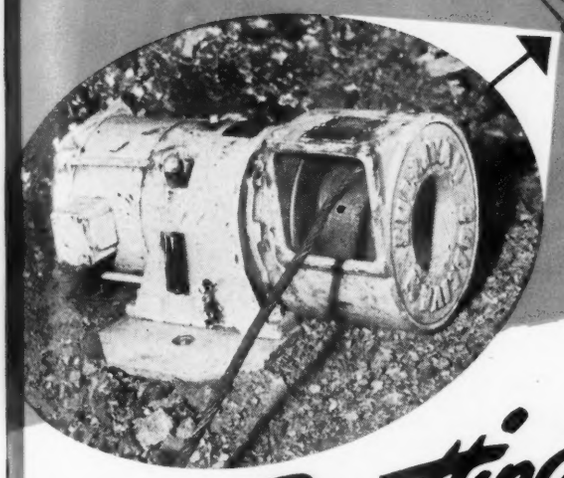
Less Bark . . .
More Bite

Manasite: Reg. U.S. Pat. Off. "ROCKMASTER"—Trade Mark

ATLAS EXPLOSIVES
"Everything for Blasting"

CHEMICALS ATLAS EXPLOSIVES

ATLAS POWDER COMPANY, Wilmington 99, Del. • ***Offices in principal cities*** • ***Cable Address—Atpowco***



Car Spotting handled more Economically

SULLIVAN CAR PULLERS

slow speed, heavy duty pullers that can be remotely controlled

Powerful, precisely controlled pull. Low maintenance cost. All working parts are totally enclosed. Automatic motor-shaft brake holds cars on grades. Anti-back-lash brake prevents over-spinning of drum. The Sullivan RP rope puller (top) economically complements the car puller.

JOY LOADERS

load more tonnage more quickly

Many models to suit individual requirements, high or low seams.

W&D CL

SULLIVAN DIVISION

JOY MANUFACTURING CO.

GENERAL OFFICES: HENRY W. OLIVER BLDG., PITTSBURGH, PA.

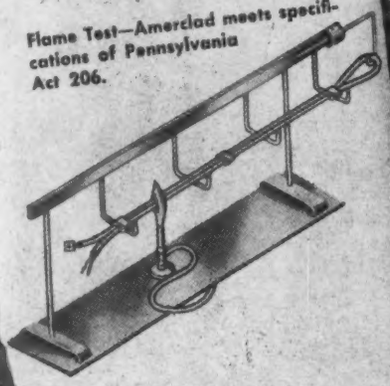
Consult a Joy Engineer

Flexible ground strand assures maximum safety to workers and greater strength.

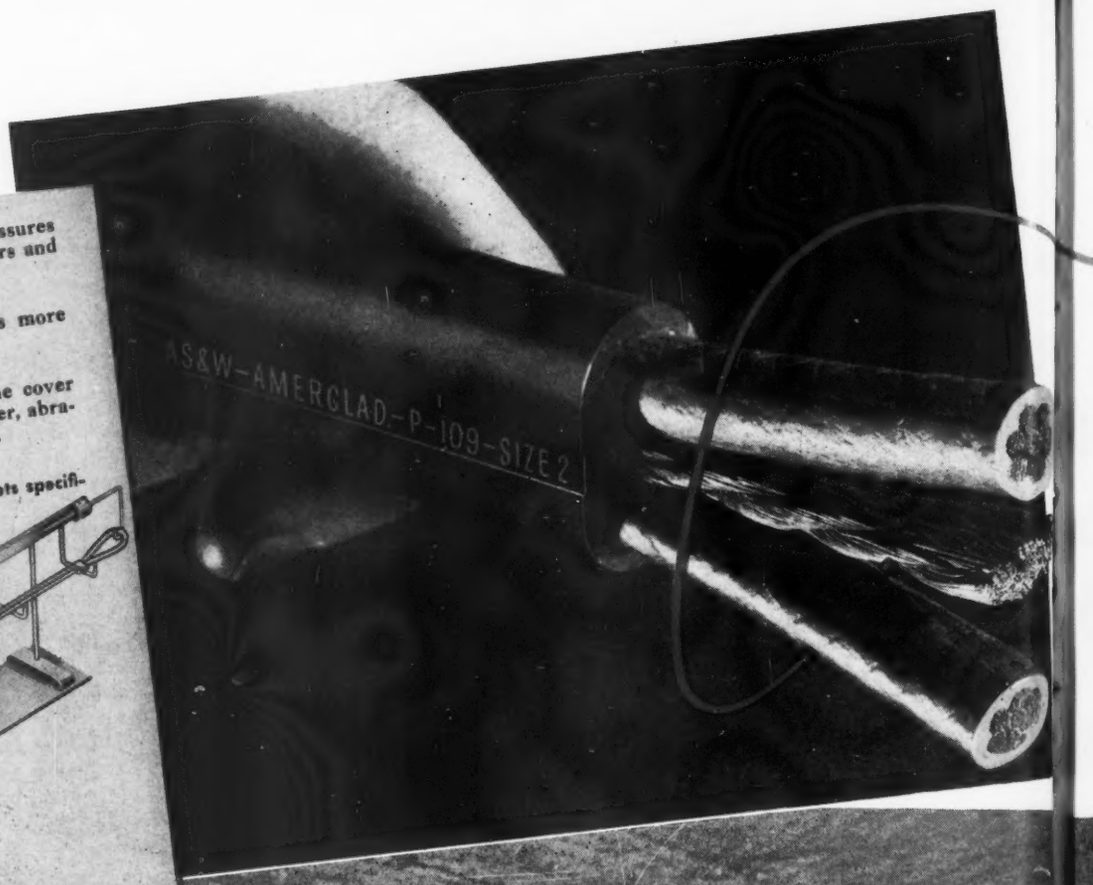
Flat construction permits more cable on reel.

Flame-resisting Neoprene cover also resists oil, acid, water, abrasion and rough handling.

Flame Test—Amerclad meets specifications of Pennsylvania Act 206.



Positive grounding of rubber-tired mining machines is assured with this new U·S·S Amerclad Cable with flexible ground strand.



New AMERCLAD

Twin Parallel Mining Machine Cable

1. With flexible-ground strand

2. With flame-resisting cover

THIS new Amerclad Twin Mining Machine Cable is especially engineered to satisfy the needs of the latest mining practices.

A flexible copper ground strand has been inserted between the two conductors which assures a positive ground for rubber-tired machines.

The flame-resisting Neoprene jacket passes the rigid flame tests as set up by the state of Pennsylvania. What's more, the jacket not only resists oil, and water and mud but is extremely tough to withstand dragging over sharp rocks and coal.

Flat construction requires less space on the reel and is lighter in weight than two-conductor round cables of the twisted type.

Easy splicing is characteristic of flat cable and the center ground strand can be spliced just like any other conductor.

Greater safety is assured to workers on the machine or from accidental penetration of the cable with hard tools.

A complete line of mining wire and cable is manufactured by American Steel and Wire Company. Write for our special catalogs covering the various types.

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UNITED STATES STEEL

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U·S·S AMERICAN PRODUCTS FOR MINING INCLUDE:

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U·S·S AMERCLAD CABLE

Service Ratings			
Type	Size	Pounds per square inch	
		Steam	Non-Shock Cold WOG
Screwed	¼"—2"	150	225
	2½"—4"	125	175
Flanged	1"—2"	125	200
	2½"—4"	125	175

Fig. 709 Saddle Style —
Inside Screw — Bronze Mounted or All Iron

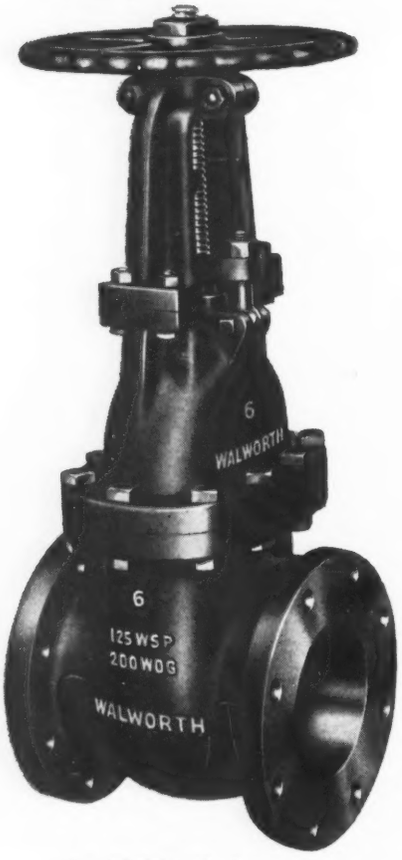

Fig. 726F Standard —
Outside Screw and Yoke — Bronze Mounted or All Iron

Service Ratings			
Type	Size	Pounds per square inch	
		Steam	Non-Shock Cold WOG
Screwed or Flanged	2"—12"	125	200
	14"—16"	125	150
	16" and larger	*	150

* For steam service requiring valves 18" and larger we recommend the use of Walworth 150-Pound Cast Steel Valves.

Walworth

iron body wedge gate valves

...the last word in Dependability

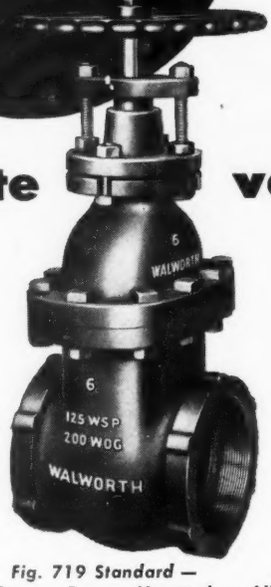

Fig. 719 Standard —
Non-Rising Stem — Bronze Mounted or All Iron

Service Ratings			
Type	Size	Pounds per square inch	
		Steam	Non-Shock Cold WOG
Screwed or Flanged	2"—12"	125	200
	14" and larger	125	150

Walworth Fig. 709 Saddle Gate Valves are recommended for lines carrying sludge, and fluids of high viscosity. They are easy to take apart, clean, and put together. They are available in either bronze mounted or all iron types, screwed or flanged ends. Two holes inside the bonnet of bronze mounted valves permit draining when the valves are open, thus eliminating the risk of damage to the valve due to freezing. All parts are designed for maximum service and strength.

Walworth Fig. 719 Standard Non-Rising Stem Valves are recommended for general service. The bronze mounted valves are furnished with bronze stems, seat rings, and disc faces. The all iron valves have nickel-plated steel stems, integral disc faces, and renewable screwed-in seat rings. Non-rising stems make them suitable for use where clearance is a factor. When the valves are open, the disc is clear of the fluid passageway.

Walworth Fig. 726F Standard OS&Y Valves are especially recommended for steam and services above atmospheric temperature. Their streamlined ports permit smooth, easy flow.

For further information about Walworth Iron Body Valves, as well as Walworth's *complete line* of valves, fittings, and flanges, see your nearby Walworth distributor, or write:

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valves and fittings

60 East 42nd Street, New York 17, N. Y.

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A type 8H60 Jeffrey AERODYNE (R) Fan (below) ventilating a Pennsylvania Anthracite mine. Jeffrey AERODYNE (R) fans are the most popular and widely accepted mine fans in use today .. more than 500 installations since it was introduced in 1936. This installation and many others as well as drawings and tables are reproduced in our new Fan Catalog No. 797. Send for your copy TODAY.

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With the marked increase in the use of Anthracite, especially in the east, more and more mechanical equipment has been put into operation to speed up production and reduce costs. Today, Jeffrey is well represented throughout the Anthracite area . . fans, locomotives, chain and belt conveyors, SHORTWALL (R) cutters, and drills.

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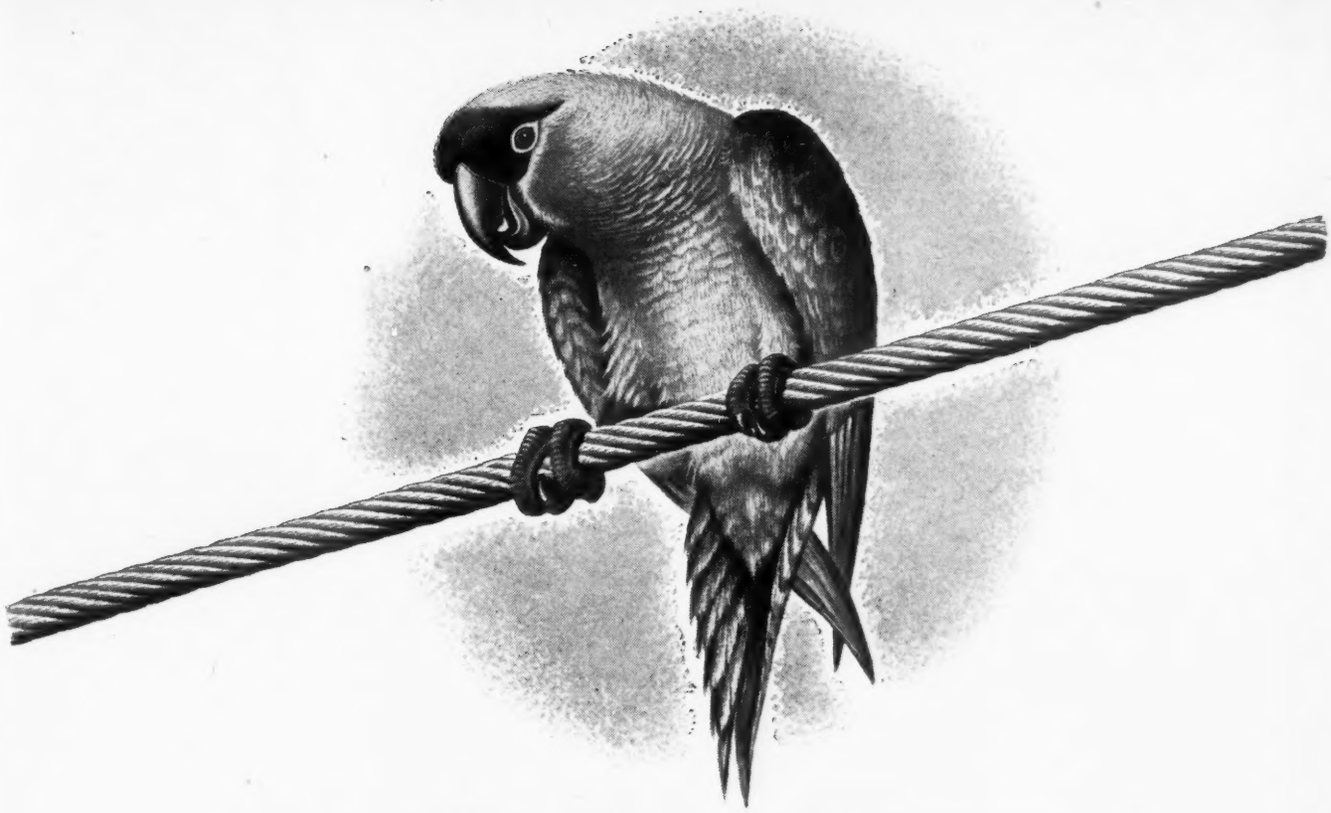

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Not long ago somebody said to a Bethlehem man, "You folks are always harping on the 'right' wire rope. Why do you make such a point of this?"

Because it's a fundamental that no purchaser should ever overlook. The *right* wire rope for any given job means longer rope life . . . better service . . . more for your money.

Wide differences exist in wire ropes. There are many constructions, many sizes, different lays and cores. Several grades of steel are used in their making. The rope that's perfect for one kind of work may not do at all for another kind.

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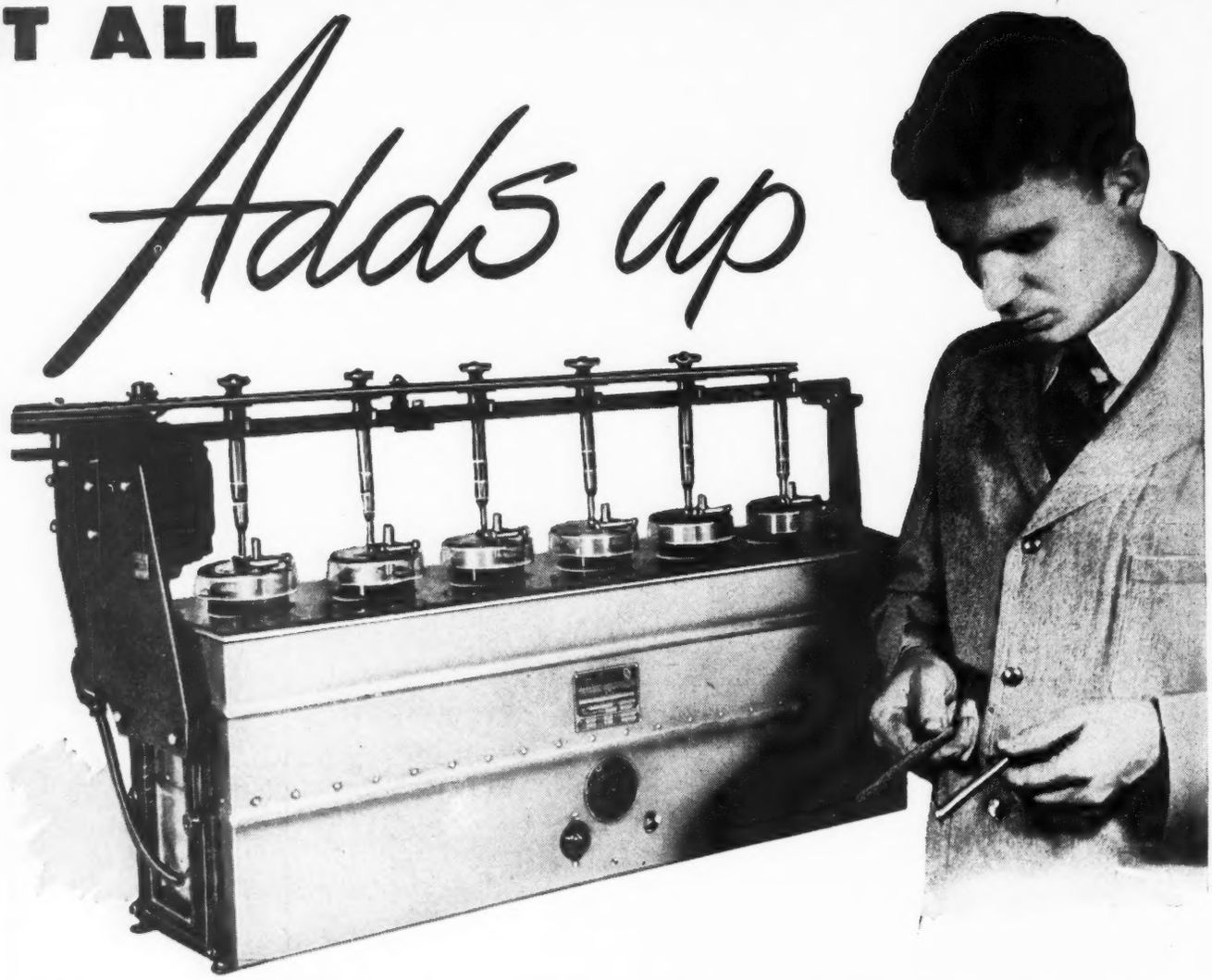
We'll be glad to look over your equipment and help you check your wire-rope needs. Ask a Bethlehem engineer to stop in. He's a specialist who knows the *right* wire rope for every type of machine.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation

When you think WIRE ROPE . . . think BETHLEHEM

IT ALL *Adds up*



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Pictured above is one apparatus used by Sinclair Research to determine the rust-inhibiting efficiency of oils manufactured for turbine use. Chemical additives are studied to provide such protection against rust. Obviously, the treated oil sample used on the metal rod in the technician's left hand has high rust-inhibiting efficiency and prevented the deposit shown on the other rod.

All Sinclair Research and Refinery Control is similarly thorough. *It all adds up* . . . to assure you of lubricant qualities essential to efficient and economical industrial maintenance in all applications.

Sinclair Automotive Lubricants for Strip Mining

For Engines:
OPALINE MOTOR OIL
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(For severe service)
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FLAME RETARDANT

U. S. Royal Cables are called "Flame Retardant" only after they've passed the severe "Flame Test." That's to make sure they conform to strict fire prevention laws. The Department of Mines of the Commonwealth of Pennsylvania, for example, assigns U. S. Royals the number "P-103" to indicate conformity with the Department's high fire-safety standards.

U. S. Rubber Company scientists, in their "Safety-Testing" program, also put U. S. Royal Cables through ordeals of bending, twisting, impact, stretching and moisture absorption.

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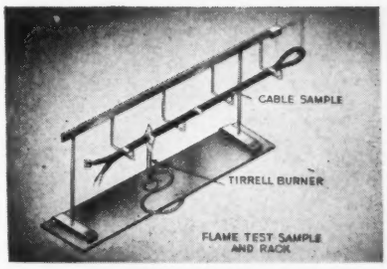

THIS IS THE FLAME TEST:

400% overload current is applied to conductors until cable sheath is heated to 350° F. Inner cone tip of Tirrell burner flame then applied for 1 minute to bottom surface of folded cable. Total length charred is measure of flame-retardance and shall not exceed 14 in. U. S. Royal Mining Cables pass test with extra margin of safety.

THE NEW U. S. ROYAL *Safety Tested*

MINING MACHINE AND LOCOMOTIVE CABLES

ALLIS-CHALMERS
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COMPLETE AUTHORITATIVE PRACTICAL

— ONLY ALLIS-CHALMERS OFFERS YOU THIS ADVANCED ENGINEERING

THIS IS the most complete V-belt drive reference book ever published. It contains:

PRE-ENGINEERED DRIVE TABLES—1 to 150 hp, thumb-indexed for quick reference. Just turn to the page you want — read off the complete drive data.

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Book contains 144 pages, size 8½ by 11 inches. Thumb index and classified index make it easy to use.

ANNOUNCES
Texrope Drives

..and a NEW Texrope Manual that Makes Selection Easy

THIS MANUAL marks a revolutionary advance in the application of V-belt drives. It enables every user to select, with unerring accuracy, the one *best* drive for any normal requirement. It eliminates guesswork, figuring and chance for error. It assures greatest possible economy and efficiency in the use of Texrope V-belt drive equipment.

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Copies of this new manual have been sent to many Texrope users and dealers. If you have not received one, write for Texbook No. 20P40. ALLIS-CHALMERS, MILWAUKEE 1, WISCONSIN. A 2249

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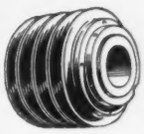
— sheaves in a full range of sizes, grooves.



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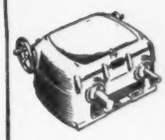
Exact variations in speed, stationary or motion control.



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Finest V-Belt engineering talent in the world—at your call.

TEXROPE "Super 7" V-Belts result from the cooperative research of two great companies — Allis-Chalmers and B. F. Goodrich. They are sold only by A-C.

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116% MORE POWER PER POUND . . .

Up to 134% more starting torque per pound of motor . . . with as much as 116% more maximum torque per pound! As much as one third smaller . . . yet stronger mechanically AND electrically than any previous Westinghouse induction motor!

That's the achievement represented in the Westinghouse Life-Line—the biggest single advance in fundamental motor design in 58 years.

It wraps up in one solid steel-encased package, user preferences formerly obtainable only as custom-built features, if at all.

It makes available to industry, in a standard line of motors, improvements perfected for special wartime requirements.

Life-Line Motors are now in production at the new Buffalo Westinghouse Motor Plant, in frame sizes representing the popular demand of induction motor ratings. Check your nearest Westinghouse office for availability, or write Westinghouse Electric Corporation, P. O. Box 2025, Buffalo 5, N. Y.

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Life-Line motors

up to ⅓ less space!

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All frames, feet and brackets are HEAVY STEEL. Stators are far stronger... new core locking device eliminates rivets.

NO LUBRICATION FOR 5 YEARS

No greasing is needed for AT LEAST FIVE YEARS. Bearings are pre-lubricated... sealed against dirt and moisture.

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Life-Lines cut vibration and noise to new low limits for standard motors... satisfy many "special motor" needs.

LESS SPACE PER HP

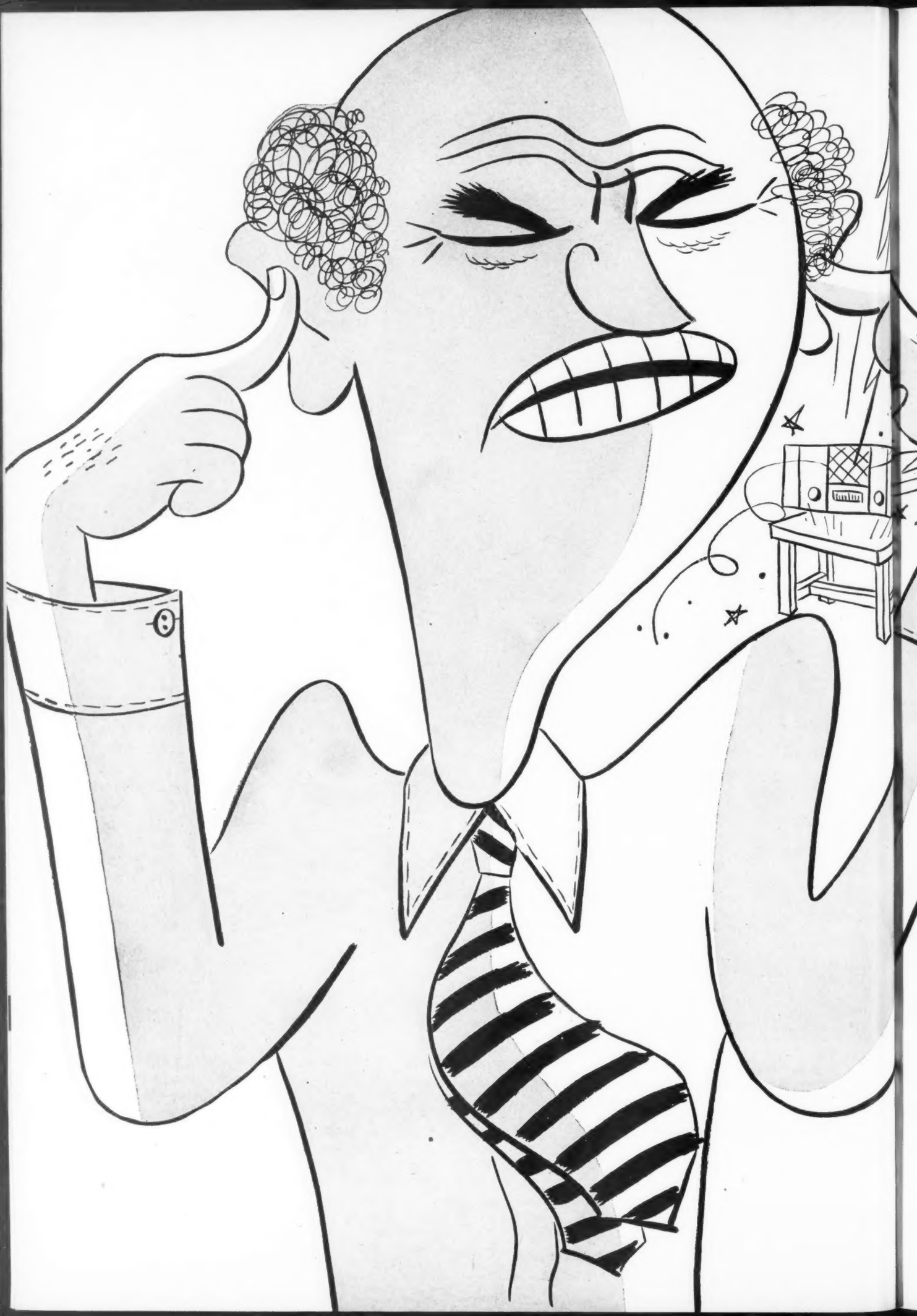
Life-Line Motors occupy less space per hp than any other standard motor... are easier to build into machines and install in cramped quarters.

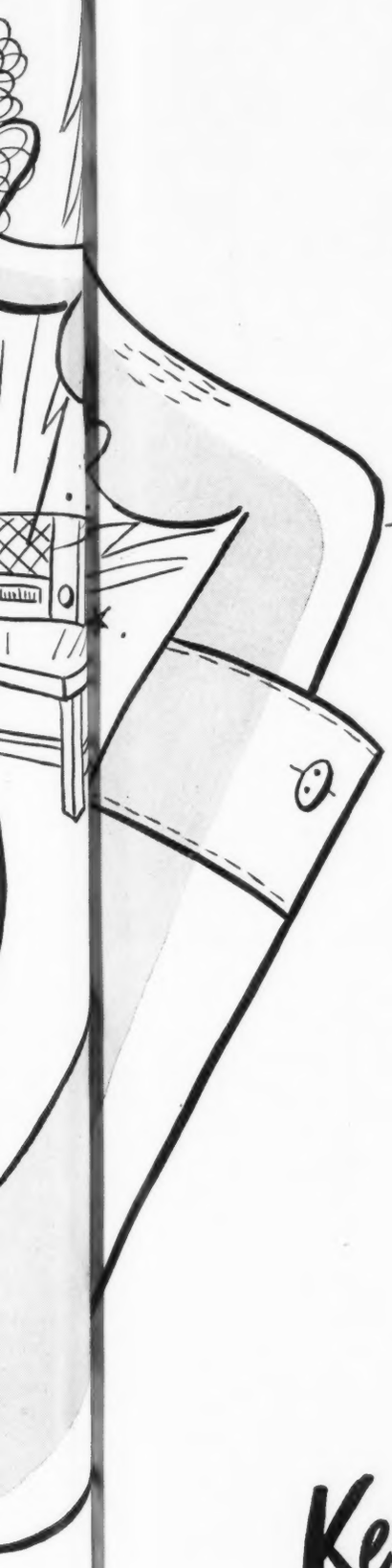
IMPROVED WINDINGS

New insulating materials... coil winding techniques ... stator slot designs... give new record-setting protection against electrical failures.

NEW SLEEK LINES

The Life-Line has sleek lines ...a smooth finish... discourages dust and dirt accumulations... harmonizes with modern machine and tool design.





Static!

WHAT has static to do with coal? Plenty! Ironically enough, the word static, according to its number-one dictionary definition, means "still, at rest, not moving." But in any coal-mining program there certainly is lots of static (both kinds) when the coal does *not* move.

Railway cars have to move in, move out, move to market, move back—promptly and swiftly.

No "Static" on the C&O

The Chesapeake & Ohio Railway keeps an ample supply of coal cars moving to tipples, distributors, mills, factories, power plants, follows up deliveries with organized system to expedite quick return of empties.

This railroad does not and never will hesitate to spend all the money necessary to keep its facilities ahead of its job as a coal carrier. The management of this railroad is fully conscious of its great responsibility to the coal industry. There is no "static" of any kind in C&O coal service. And there won't be.

Chesapeake & Ohio Railway

Keep the home fires burning coal

Reduce Operating Costs with Modern

Increase Production

a.c.f. Mine Cars!

Modern a.c.f. Mine Cars will go a long way in reducing operating costs and increasing your daily output of coal.

Up-to-the-minute a.c.f. car-design affords greater capacity for a larger payload every trip . . . practically eliminates delays from derailments . . . and slashes maintenance to a bare minimum.

Here are a few reasons why there's no finer mine car built. Heavy-duty, double action spring bumpers absorb those severe draft and buffing shocks and increase car life. All-welded steel end sills assure structural rigidity. Chilled-tread wheels fitted with anti-friction bearings move heavy loads easily, with less friction on the rails!

Why not discuss your haulage problems with our Sales Representatives? They will be glad to explain all the features of the many types of a.c.f. Modern Mine Cars.

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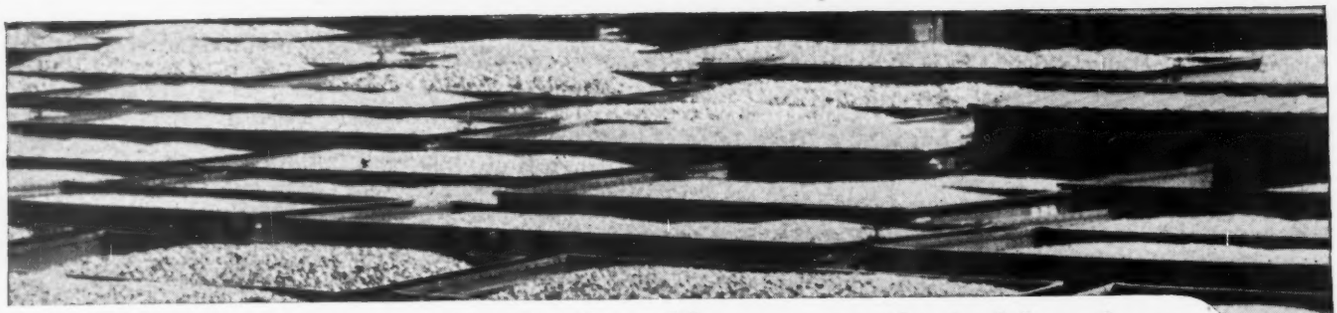
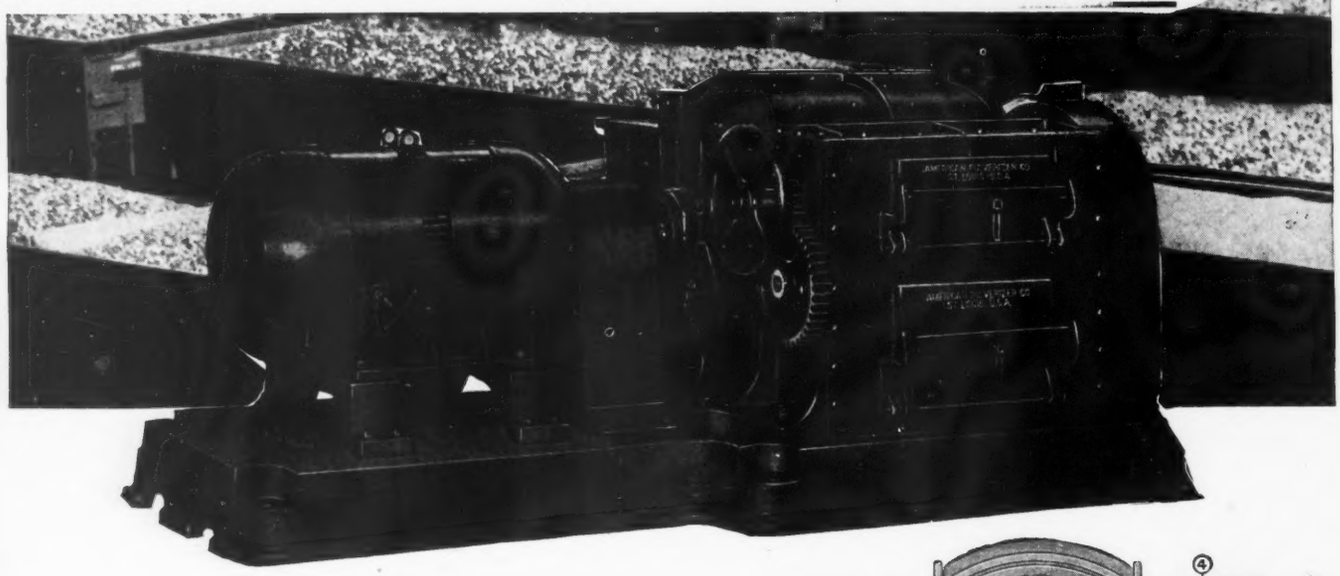
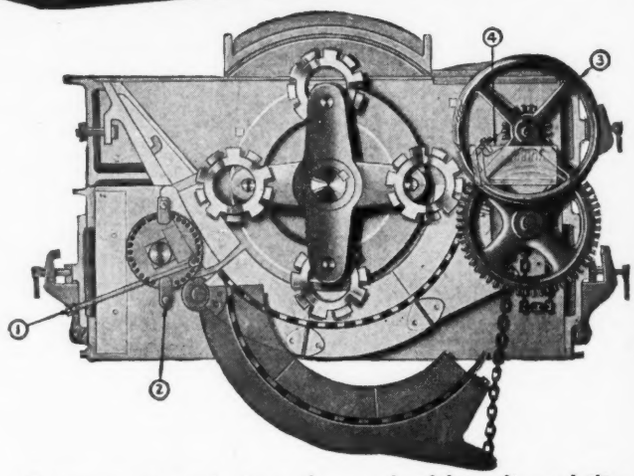


For high tonnage output of uniform, marketable sizes

AMERICAN ROLLING RING CRUSHERS



Readily marketable stoker and pulverizer sizes are profitably produced in American Rolling Ring Crushers. Through the splitting action of the patented shredder rings revolving at slower speeds, sizing is held uniform in high tonnage production with a minimum of undesirable fines. Americans are doubly adjustable for great flexibility of sizing to meet seasonable requirements and market conditions. Americans are available in a wide choice of types and sizes to exactly suit your operation . . . capacities from 50 to 500 TPH.



Cross sectional view shows double adjustability and the manner in which the shredder rings, revolving free on individual shafts, can deflect from tramp iron to give uninterrupted production and protect the crusher from injury. An easily cleaned metal trap catches and holds tramp iron.

Send for "AC" Bulletin on coal crushing data and crusher specifications

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Originators and Manufacturers of Ring Crushers and Pulverizers

1119 Macklind Avenue
St. Louis 10, Mo.

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JOY LOADERS

ARE TIME-PROVED TO REDUCE COAL HANDLING COSTS

Left below, the tonnage producing 11-BU loading out in a high seam operation.

Right below, the 14-BU provides high capacity loading in low seams.

There's a Joy Loader for Every Seam

12-BU for conveyor mining

14-BU 30½", 33" and 36" high

11-BU 60" high

WAD

Consult a Joy Engineer

JOY DIVISION

JOY MANUFACTURING CO.

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GOODMAN MANUFACTURING COMPANY

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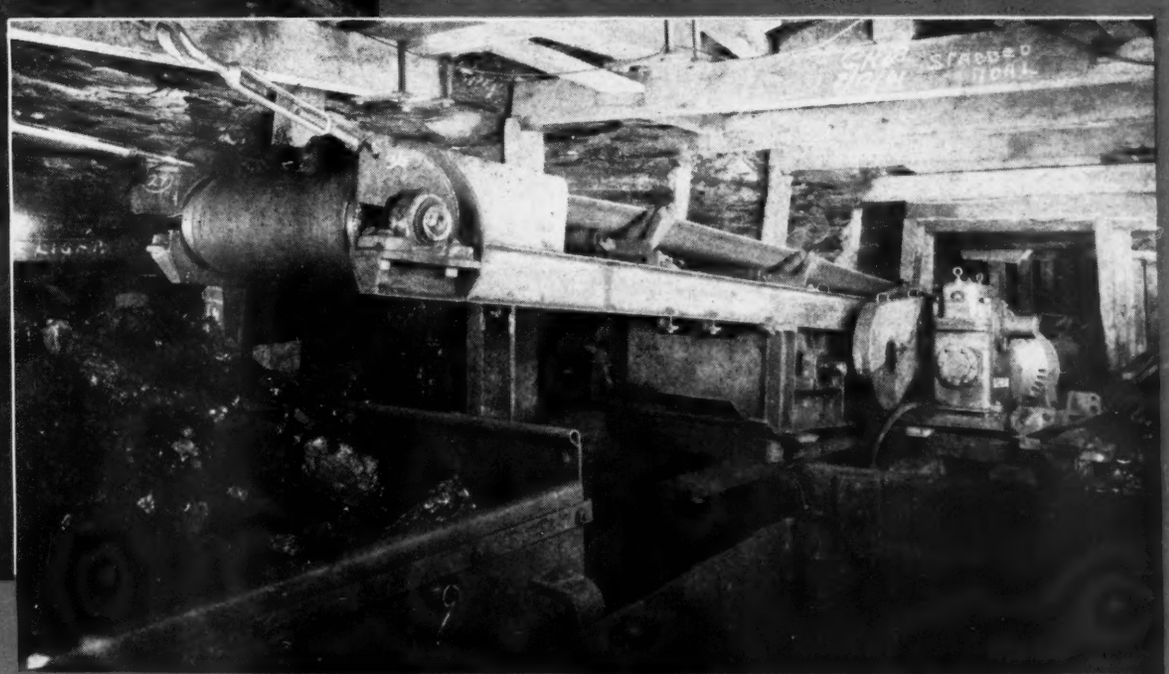
FOR FAST, LOW COST TRANSPORTATION OF COAL UNDERGROUND

Gathering service and main entry haulage, any practical lengths — each unit rated to meet load requirements from shaker, chain, belt or shuttle car feeders.



12348

HALSTED STREET AT 48TH • CHICAGO 9, ILLINOIS

World's biggest dipper carried on Timken bearings

EVERY time the dipper on this giant Marion 5561 power shovel takes its 40 cu. yard bite of earth, the combined weights of the dipper and its contents (over 100 tons) are carried on the boom point sheaves. Every time this 100 ton load is raised or lowered, the boom point sheaves must rotate easily to prevent cable wear.

What kind of bearings can carry this tremendous load and operate freely, dependably? Timken tapered roller bearings—and here's why:

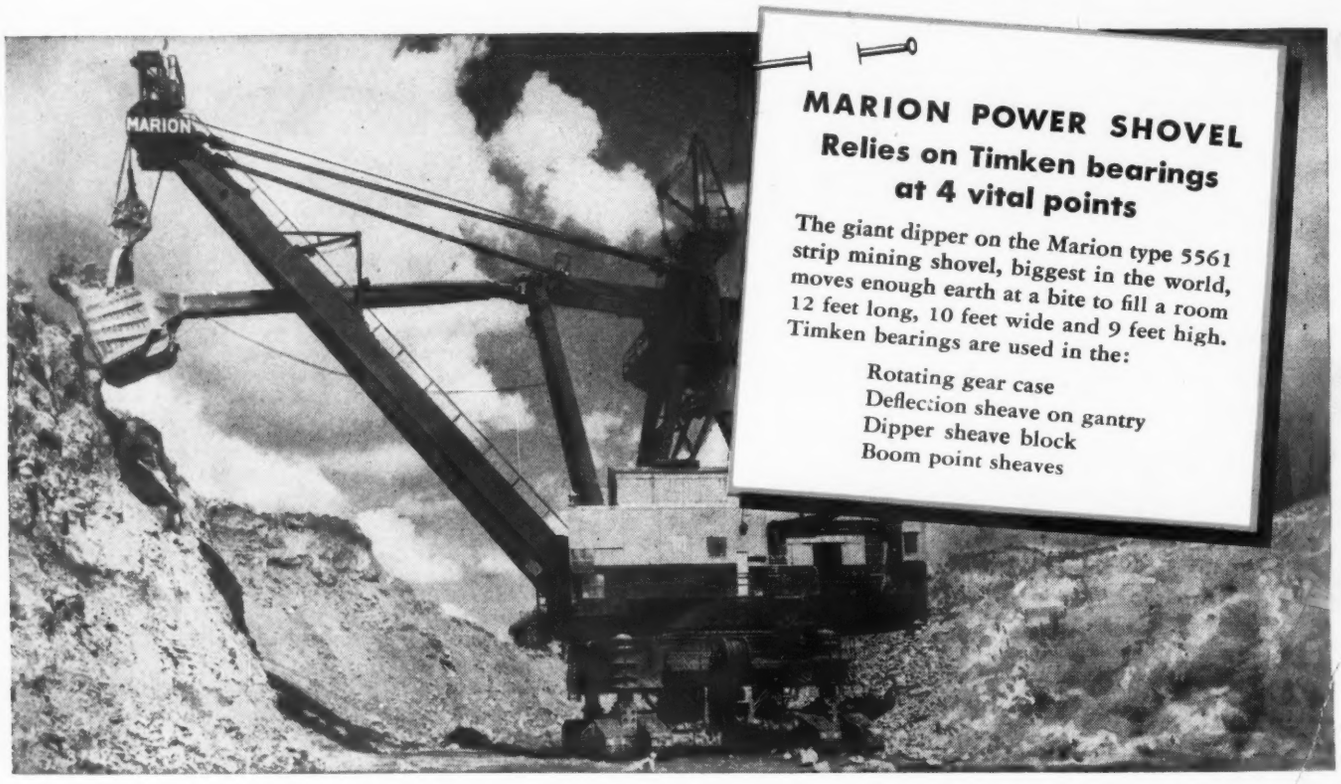
Timken roller bearings are made from the finest bearing steel ever developed—Timken fine alloy steel. Due to the line contact between rolls and races, and the positive alignment of the rolls, Timken bearings have tremendous load carrying capacity. And even under tremendous loads their true rolling motion and incredibly smooth surface finish enable Timken bearings to operate freely, frictionlessly.

Timken bearings permit the use of closures which effectively retain lubricants, saving both maintenance time and materials. Built to last, they normally outwear the machine itself. They take any combination of radial and thrust loads.

No other bearing can give your equipment *all* the advantages you get from Timken bearings. Be sure they're used wherever wheels and shafts turn on the machinery you build or buy. The Timken Roller Bearing Company, Canton 6, Ohio.

TIMKEN BEARING EQUIPPED

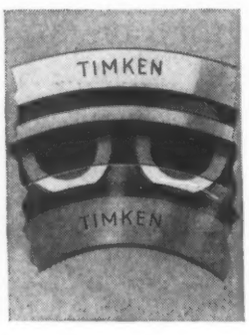
This symbol on a product means its bearings are the best.



MARION POWER SHOVEL
Relies on Timken bearings at 4 vital points

The giant dipper on the Marion type 5561 strip mining shovel, biggest in the world, moves enough earth at a bite to fill a room 12 feet long, 10 feet wide and 9 feet high. Timken bearings are used in the:

Rotating gear case
Deflection sheave on gantry
Dipper sheave block
Boom point sheaves

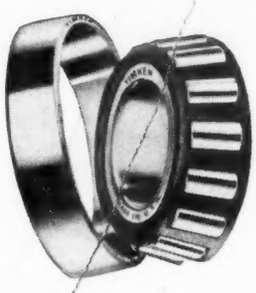


POSITIVE ROLLER ALIGNMENT

Rollers of Timken bearings are prevented from skewing by the wide area contact between roll ends and rib of the cone . . . a development of The Timken Roller Bearing Company. Result: bearings roll easier, last longer.

The Timken Roller Bearing Company is the only bearing manufacturer in the country which makes its own steel, and is the acknowledged leader in: 1. advanced design; 2. precision manufacture; 3. rigid quality control; 4. special analysis steels.

TIMKEN
TRADE MARK REG. U. S. PAT. OFF.
TAPERED ROLLER BEARINGS



NOT JUST A BALL ○ NOT JUST A ROLLER ▭ THE TIMKEN TAPERED ROLLER ▭ BEARING TAKES RADIAL ◫ AND THRUST ⟷ LOADS, OR ANY COMBINATION ✳

Free tipple machinery from cold weather's grip!

Less power consumption and bearing wear with . . .

SUPERLA GREASES

ARE YOU using excess power to start stiff tipple machinery in cold weather? Losing a costly bearing, now and then, because cold-hardened grease won't feed freely, or because it gets too thin to lubricate at operating temperatures?

A change to superior Superla Greases can reduce these cold-weather operating costs to a minimum. The proper grade of Superla for winter will not thicken excessively at low temperatures nor will it be too thin when operating temperatures are reached.

Superla Greases exceed ordinary lubricants in stability at high temperatures because they are compounded of stable soaps and highest quality oils. They provide reliable, economical bearing lubrication for crusher and screen eccentrics, conveyor idlers, mine cars, and other heavy-duty mine equipment.

Discuss the maintenance-reducing appplications of Superla Greases in your mine with a Standard Oil Lubrication Engineer. Write Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.

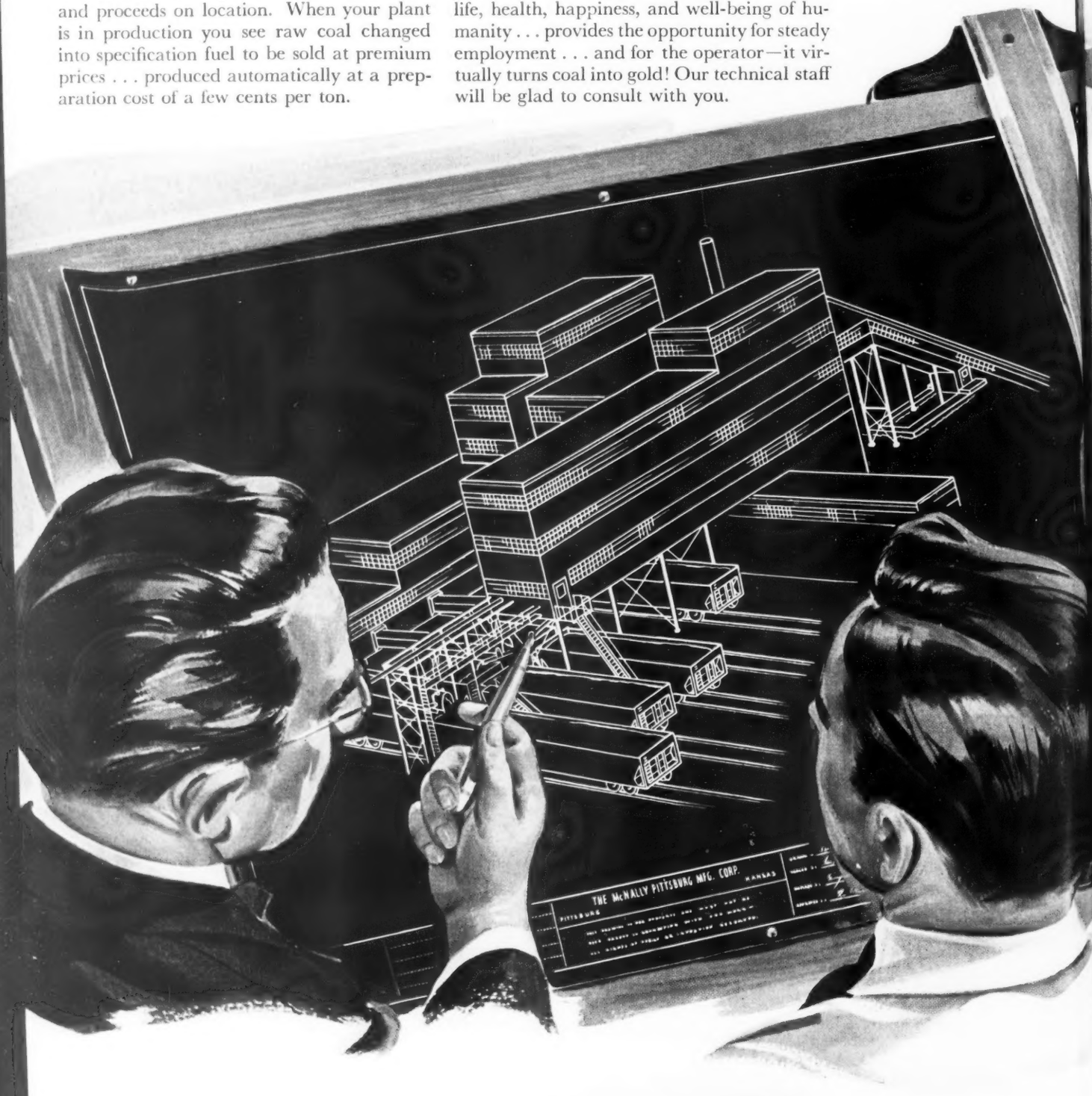
STANDARD OIL COMPANY (INDIANA) STANDARD SERVICE

A Coal Mining Company "Fixing" to make its own markets

It could be your Company!

The first step is an analysis of your raw coal in our laboratories to determine what beneficiation is possible. The plant is engineered to meet that accomplishment. Erection starts and proceeds on location. When your plant is in production you see raw coal changed into specification fuel to be sold at premium prices . . . produced automatically at a preparation cost of a few cents per ton.

That kind of preparation plant provides fuel for near-by markets and extends to distant markets which are hungry for better fuel . . . produces coal to furnish the power for the life, health, happiness, and well-being of humanity . . . provides the opportunity for steady employment . . . and for the operator—it virtually turns coal into gold! Our technical staff will be glad to consult with you.

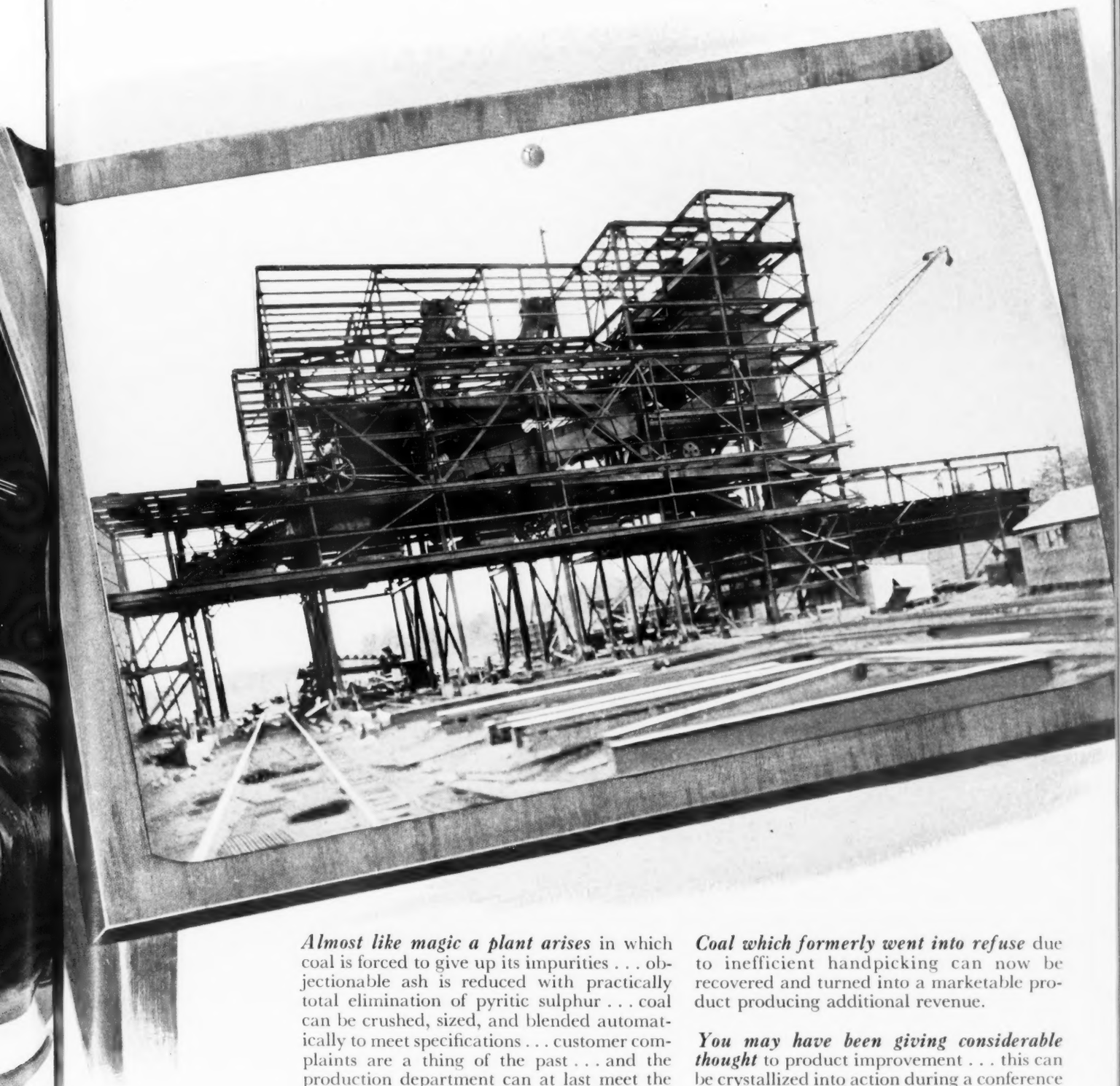


McNally Pittsburg Manufacturing Corporation— **Works: Pittsburg, Kansas • Wellston, Ohio**

Engineering & Sales Offices: Pittsburg, Kan. • Chicago (1), Ill. • Pittsburgh (22), Penna. • Wellston, Ohio • Caixa Postal 1310, Rio de Janeiro, Brazil

A Guaranteed Market under Construction

to produce fuel to Customers' Specifications



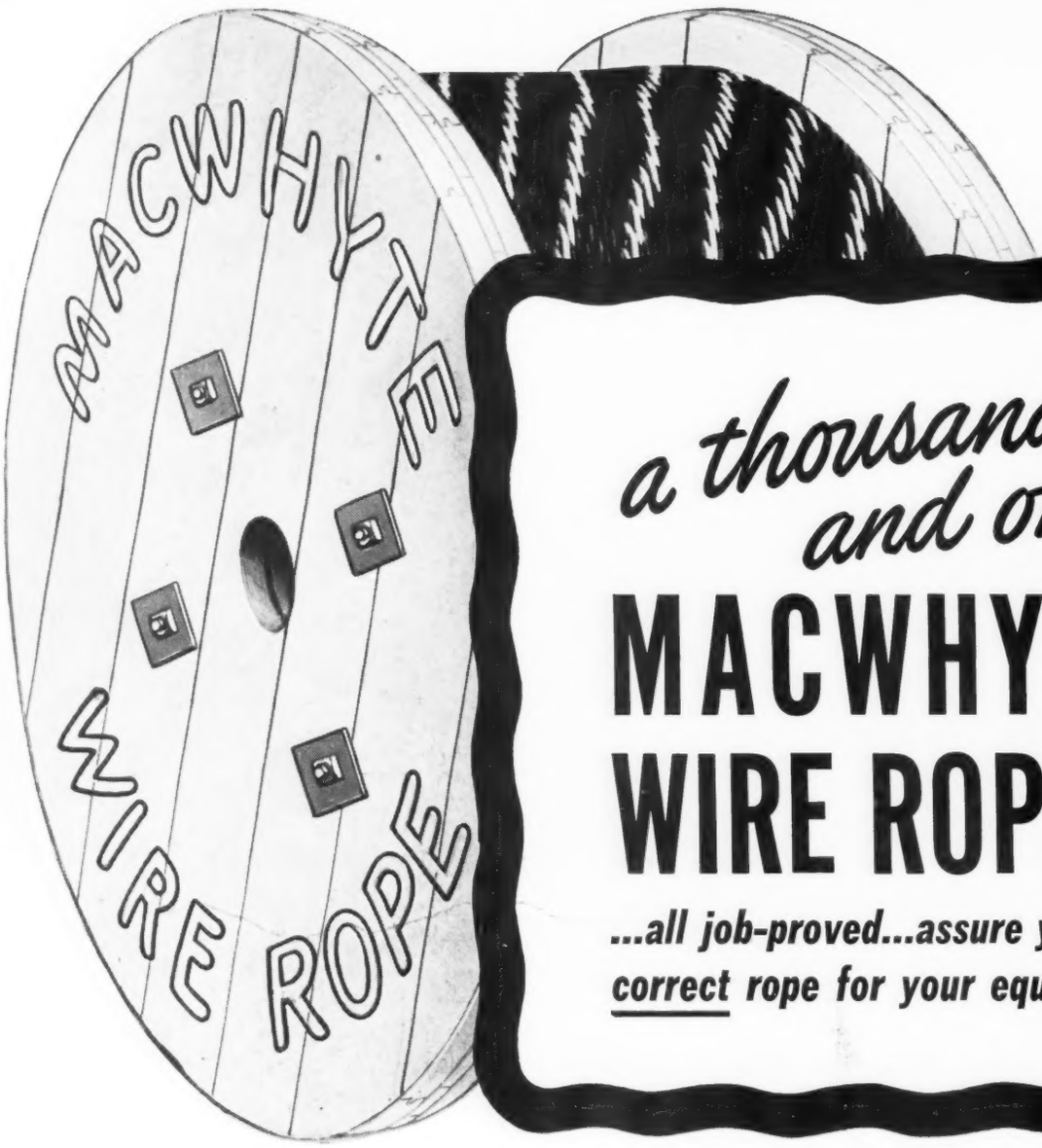
Almost like magic a plant arises in which coal is forced to give up its impurities . . . objectionable ash is reduced with practically total elimination of pyritic sulphur . . . coal can be crushed, sized, and blended automatically to meet specifications . . . customer complaints are a thing of the past . . . and the production department can at last meet the specifications of the sales department.

Coal which formerly went into refuse due to inefficient handpicking can now be recovered and turned into a marketable product producing additional revenue.

You may have been giving considerable thought to product improvement . . . this can be crystallized into action during a conference with our technical staff.

McNALLY PITTSBURG

MANUFACTURERS OF EQUIPMENT TO MAKE COAL A BETTER FUEL



a thousand and one

MACWHYTE WIRE ROPES

...all job-proved...assure you the correct rope for your equipment

MACWHYTE PREFORMED AND NON-PREFORMED INTERNALLY LUBRICATED WIRE ROPES...MONARCH WHYTE STRAND Wire Rope...Special Traction Elevator Rope...Stainless Steel Wire Rope...Monel Metal Wire Rope...Galvanized Wire Rope . . . Spring-lay Wire Rope . . . Atlas Braided Wire Rope Slings, Hi-Fatigue Aircraft Cables, Assemblies and Tie-Rods. Catalogs on request.

When you use the correct wire rope, both the rope and your equipment last longer, cost less to operate. Macwhyte consulting engineers will check your equipment and recommend the wire rope specifically engineered for your job. Ask your Macwhyte distributor, or write Macwhyte Company.

Make
MACWHYTE
your headquarters for
WIRE ROPE
and SLINGS

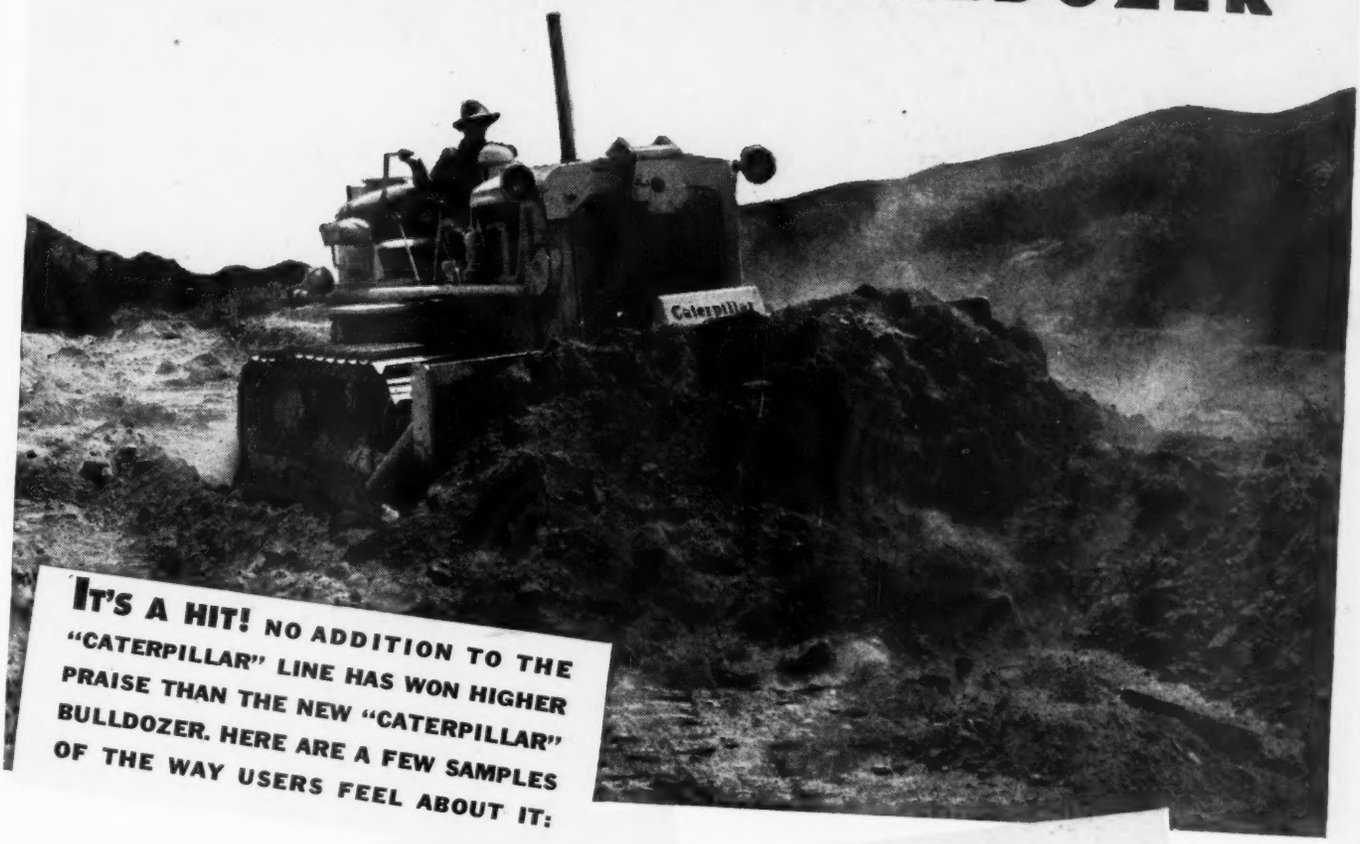
MACWHYTE WIRE ROPE

Manufactured by Macwhyte Company
2940 Fourteenth Avenue, Kenosha, Wisconsin

Mill Depots: New York · Pittsburgh · Chicago
Minneapolis · Fort Worth · Portland · Seattle
San Francisco · Los Angeles

Distributors throughout the U.S.A. and other countries

USERS REPORT ON THE "CATERPILLAR" BULLDOZER



IT'S A HIT! NO ADDITION TO THE "CATERPILLAR" LINE HAS WON HIGHER PRAISE THAN THE NEW "CATERPILLAR" BULLDOZER. HERE ARE A FEW SAMPLES OF THE WAY USERS FEEL ABOUT IT:

From Walter O'Neill, contractor, Havre, Montana

"Unquestionably it's the best and last word in 'dozers. The ability to tilt the blade enables doing lots of work that would previously have required an angledozer. We moved 9000 cubic yards in 5 days this past week. This 'dozer beats any we know of."

From N. M. Whilden, contractor, Dallas, Texas

"I've made no adjustments to this unit in 3 months, where formerly on other equipment adjustment was necessary every day."

From Harry Sandora, D7 operator, Conn.

"With the D7 and the 'Caterpillar' Bulldozer blade I can walk these 2-foot stumps right out of the ground."

From Jim Calas, farm contractor, Lakeview, Oregon

"Since running it a month, am more glad than ever I waited. It does everything a fellow could ask. The 'dozer handles nice and easy and accurate."

From S. T. Lambeth, Greensboro, N. C.

"Best darn 'dozer I've ever owned or seen operated. Visibility is perfect; blade extremely rugged and durable; dirt seems to roll from the blade instead of sticking to it; blade reacts very quickly to the controls and it will dig harder material than any other 'dozer of comparable size on the market."

From R. H. Byles, lumberman, Fresno, Calif.

"This outfit is rugged. It's the best dirt-moving 'dozer I've seen."

From John Gaston, Main Roads Commission, Queensland, Australia

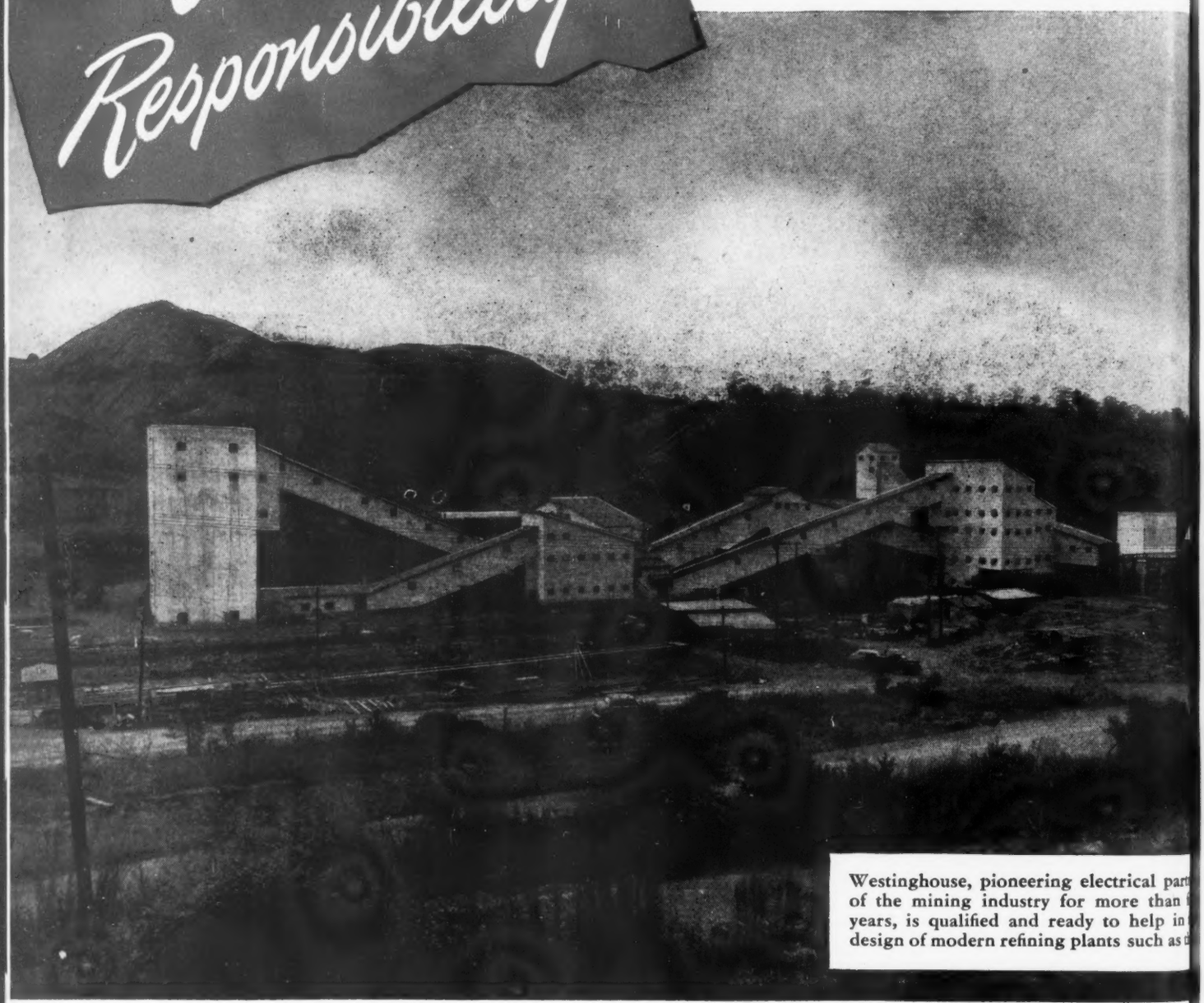
"I think the 'Caterpillar' 'dozer is the best and most easily controlled of any I have handled. Driving a D7 with 'Caterpillar' 'dozer attached, I loaded 1980 yards of earth in 8½ hours."

CATERPILLAR
REG U S PAT OFF
DIESEL ENGINES · TRACTORS
MOTOR GRADERS
EARTHMOVING EQUIPMENT

CATERPILLAR TRACTOR CO. • PEORIA, ILLINOIS

Unit Responsibility

KEY TO MOREP



Westinghouse, pioneering electrical part
of the mining industry for more than
years, is qualified and ready to help in
design of modern refining plants such as t

WE KNOW YOUR PROBLEMS . . . AND HAVE THE ANSWERS

Selection of the proper electrical apparatus is as important as the design of the refining plant itself. The equipment chosen will determine, in large measure, the efficiency and economy of operation of the entire plant.

Westinghouse *alone* can offer you the undivided responsibility for the *design, manufacture, installation* and *performance* of your refining plant electrical apparatus.

The design of this apparatus is based on more than 50 years' experience as a working partner of the mining industry. During these years, Westinghouse research and industry engineers have played an important part in perfecting and introducing many new types of electrical apparatus and *complete electrical systems* now adopted as standard by the mining industry. For example, more Westinghouse direct-current motors are used in coal mines today than all other makes combined . . . they have been the industry's standard for more than thirty years.

It is only natural, then, that many large coal companies and builders of modern coal preparation and refining plants have standardized on Westinghouse equipment throughout. For full information call your nearest Westinghouse office or write Westinghouse Electric Corp., P. O. Box 868, Pittsburgh 30, Penna.

E PRODUCTIVE POWER

"WESTINGHOUSE-EQUIPPED THROUGHOUT" MEANS SIMPLIFIED ORDERING, QUICKER INSTALLATION, MORE EFFICIENT OPERATION

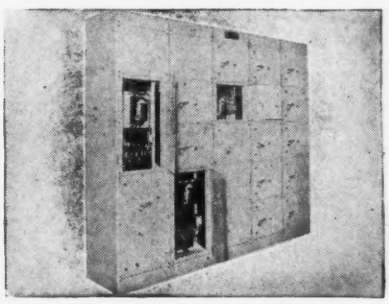
Putting power to work *productively* can be a major problem . . . or a simple one. When items must be selected, ordered and received from many sources, it means many chances for costly errors and delays . . . divided responsibility—or none at all—for performance of installed equipment.

Westinghouse offers the way to simplify the job. From equipment for generation of electrical or steam power, to the most specialized types of drives and control for its utilization, Westinghouse provides a single source of supply . . . one broad pair of shoulders competent to take responsibility for performance of all parts of the job.

Here are a few of the places where Westinghouse unit responsibility prevents headaches . . . saves money . . . assures more productive power. J-94743

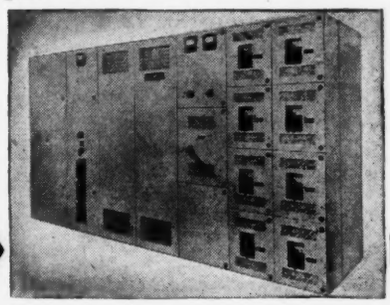
CONTROL CENTER

Westinghouse control centers are extremely flexible and provide efficient, economical centralized control. Photo shows a typical control center composed of five standard structures, with starter units mounted back to back.



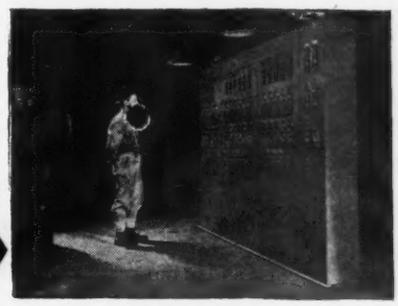
POWER CENTER

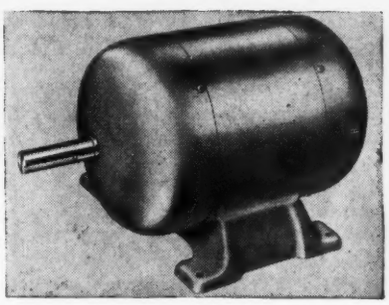
Heart of today's coal refining plants, Westinghouse power centers (as shown in photo) combine high-voltage, metal-clad switchgear, at left; ASL transformer, in center; low-voltage, metal-enclosed switchgear, at right . . . all mounted into one compact unit.



PUSHBUTTON CONTROL

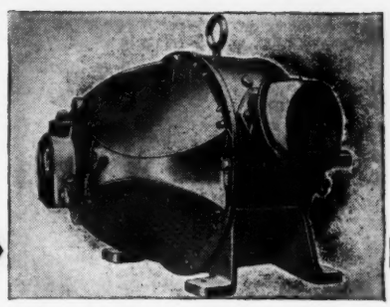
Centralizing of control for the entire plant, at a single convenient location, permits efficient supervision from a central point. This installation consists of 63 stations, controlling the operation of a 750-ton-per-hour cleaning plant.





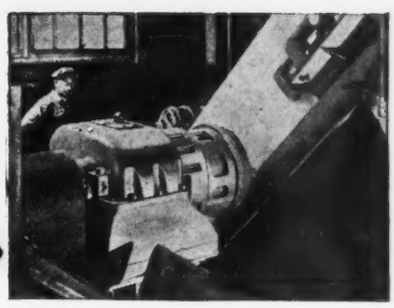
SPLASHPROOF MOTORS

Only the new Westinghouse *Life-Line* motor can be quickly changed from a dripproof—to splashproof—to a totally-enclosed motor—and back again! Shown is a 5-hp splashproof *Life-Line* motor offering full protection against moisture and dirt.



DRIPPROOF PROTECTED MOTORS

Constant research and exhaustive factory and field tests have gone into the development of the Westinghouse line of motors to meet every requirement. Shown is a d-c, dripproof, type SK motor.



GEARMOTORS

Westinghouse is the only manufacturer who has especially designed three classes of gearmotors to meet AGMA standards. Shown is a Westinghouse gearmotor in service on a crushed coal conveyer drive.

LIGHTING

Westinghouse industrial and floodlighting equipment is built in a complete line, to fill all essential lighting requirements throughout coal preparation plants.

WELDING

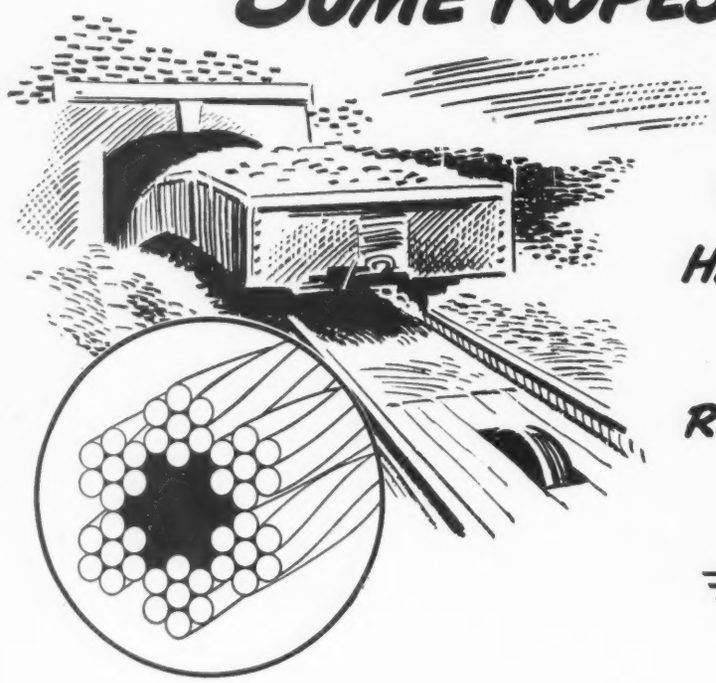
Single-source responsibility extends to a complete line of portable and stationary, a-c and d-c welders for both light and heavy-duty work. A complete line of welding electrodes and accessories is also available.

Westinghouse

PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

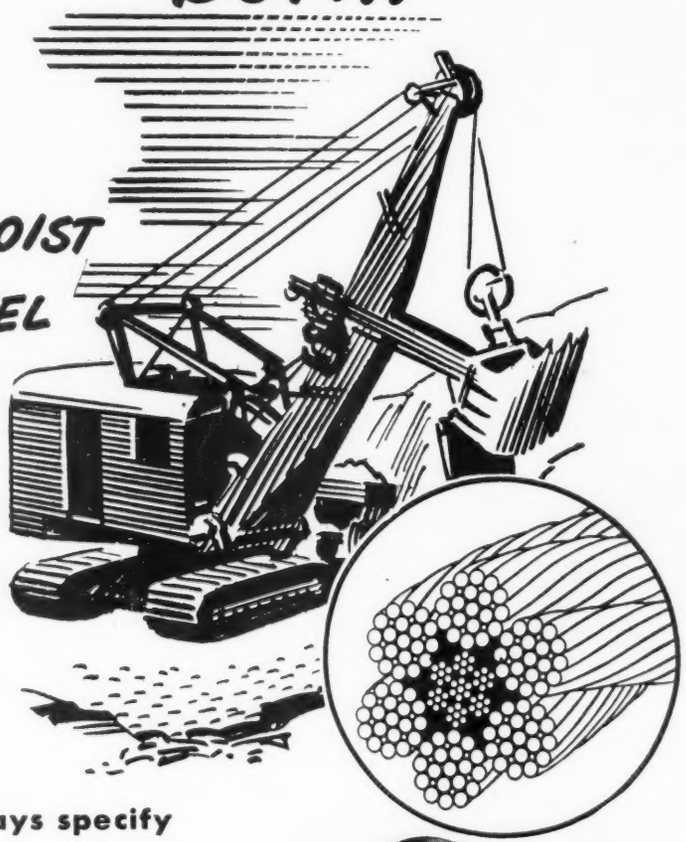
MORE PRODUCTIVE POWER FOR INDUSTRY

SOME ROPES FOOL YOU



U-W 6x7 WIRE ROPE IS GOOD FOR SLOPE HAULAGES BECAUSE IT IS COARSE AND RESISTS ABRASION —

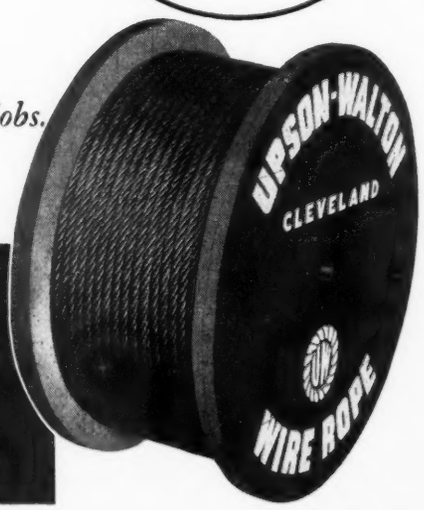
BUT...



FOR BOOM FALLS AND HOIST ROPES ON A POWER SHOVEL IT'S TOO STIFF. HERE WE RECOMMEND USING U-W 6x19 FILLER WIRE CABLE WHICH IS MUCH MORE FLEXIBLE

For longest and best service, always specify
U-W LAYRITE (*Preformed*) **IMPROVED PLOW STEEL**

We invite you to let UPSON-WALTON engineer your tough rope jobs.



Copyright 1947—The Upson-Walton Company

THE UPSON-WALTON COMPANY

Manufacturers of Wire Rope, Wire Rope Fittings, Tackle Blocks, Brattice Cloth

Main Offices and Factory: Cleveland 13, Ohio

114 Broad Street, New York 4
737 W. Van Buren Street, Chicago 7
241 Oliver Building, Pittsburgh 22

The mine Foreman (right) consults with a Gulf Lubrication Engineer (left) on cutter lubrication.

"WHEN we used an ordinary lubricant, gears and bearings in the main cutter transmission frequently failed," says this mine Foreman. "Replacement of matched mitre gears at $500 apiece—plus the cost of new bearings—totaled an alarmingly high figure, not to mention the labor costs involved."

"But that's not the case any more! Since we switched to Gulf Mining Machine Lubricant B, we've eliminated this big expense. No more lubricant leakage, no excessive wear caused by coal dust in the gear case—Gulf Mining Machine Lubricant B stays in and keeps coal dust out." Result: tonnage increased—all concerned well pleased.

It will pay you to investigate Gulf Mining Machine Lubricant B for your machines. Write, wire, or phone your nearest Gulf office and ask a Gulf Lubrication Engineer to call.

GULF INDUSTRIAL LUBRICATION

Gulf Oil Corporation · Gulf Refining Company

Division Sales Offices:
Boston · New York · Philadelphia · Pittsburgh · Atlanta
New Orleans · Houston · Louisville · Toledo

SPECIALISTS IN FITTING TRUCKS TO EVERY JOB

KB-8—for distribution of bituminous material
KBR-11—for transport of coal.
KBR-12—Truck-Tractor—for hauling heavy machinery.
KB-8-F—for mixing and transporting concrete.
THIS EMBLEM INTERNATIONAL IDENTIFIES GREAT TRUCKS
KB-6—with low frame for beverage delivery.
W-6564-OH—Truck-Tractor for heavy log transport.

FEW hauling jobs are alike. Trucks must be *specialized.* International Dealers and Branches are specialists in truck hauling problems.

There are 21 basic models in the International Line. Engineers at International's four great truck works are masters at *specializing* these 21 models into more than 1,000 different types of trucks.

That's one reason why, for each of the past 15 years, more new heavy-duty Internationals have been registered by American users than any other make of truck.

Here are two others:

1. The International Truck Point Rating System, which enables International Dealers and Branches to determine the payload that may be economically carried by a given truck in any specific operation.

2. *Specialized* truck service by International Dealers and Branches.

For any truck problem, see your International Dealer or Branch.

40TH ANNIVERSARY OF INTERNATIONAL TRUCKS
1907-1947—Forty Years of International Truck Service to Industry, Commerce and Agriculture

INTERNATIONAL HARVESTER COMPANY
180 N. Michigan Ave. , Chicago 1, Illinois

INTERNATIONAL Trucks

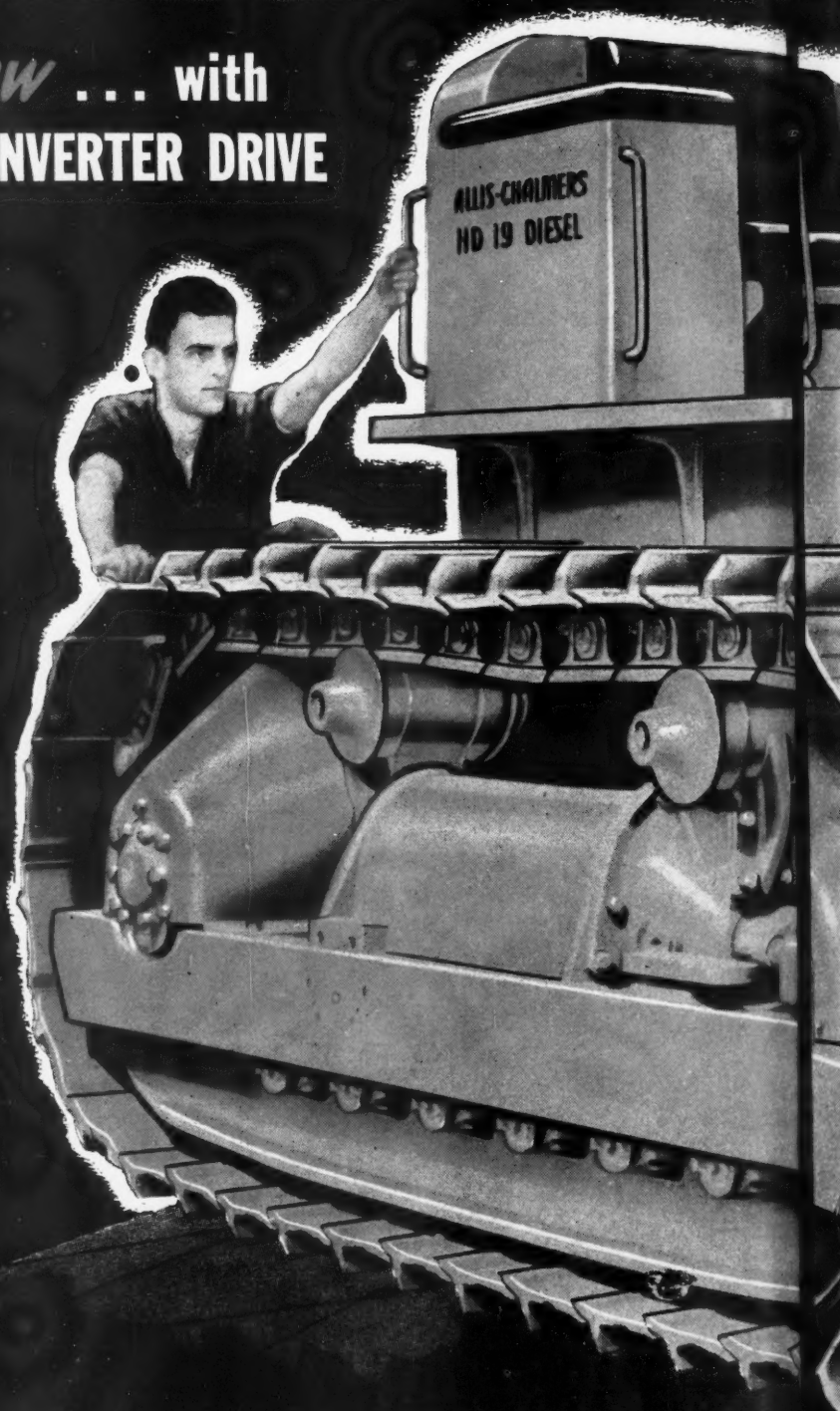
BASIS for your profits

The best diesel engine that modern research and manufacturing methods can produce . . . backed by an unmatched dealer network of power specialists who provide genuine parts, trained mechanics and technical assistance. These are two important reasons why your investment in Cummins Dependable Diesels will prove profitable.

CUMMINS ENGINE COMPANY, INC. • COLUMBUS, INDIANA

Now WORLD'S LARGEST MOST POWERFUL tractor

Completely New . . . with HYDRAULIC TORQUE CONVERTER DRIVE



BUILT TO GET MORE WORK DONE

● Weight: 40,000 pounds. ● Power: 2-Cycle General Motors Diesel — 163 hp. at flywheel. ● Torque converter automatically balances load and speed without gear-shifting. ● Speeds: 0 to 3.0 in low gear and 0 to 7.0 in high; reverse, 0 to 5.5. ● More traction, more ground contact, better balance.

BUILT TO LAST LONGER, WITH LESS UPKEEP

● Torque converter smooths tractor performance — cushions engine and transmission from shock loads. ● Simplified maintenance — major assemblies conveniently serviced or removed. Operating adjustments easily reached, quickly made. ● Reduced lubrication — greasing intervals lengthened throughout . . . 1,000 hours on truck wheels, support rollers, front idlers. ● High clearance — over 16 inches.

BUILT FOR EASIER CONTROL AND GREATER OPERATOR COMFORT

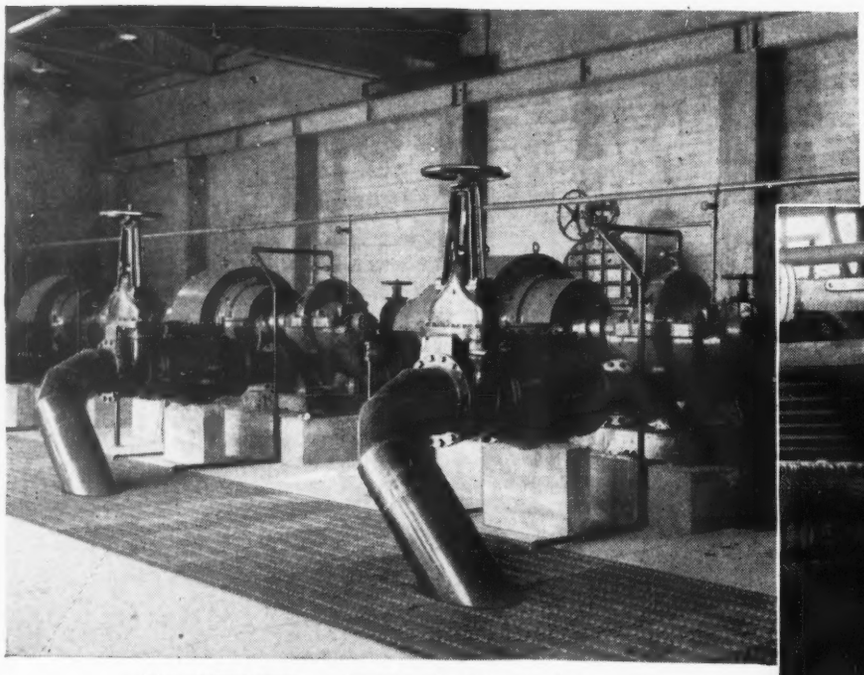
● Torque converter eliminates most shifting. ● Hydraulic, finger-tip steering. ● Convenient controls. ● Self-energizing brakes. ● New type, adjustable split seat. ● Wide arm rests. ● Adjustable brake pedals. ● Full visibility. ● Comfortable foot rests. ● Clean platform.

ALLIS-CHALMERS

TRACTOR DIVISION • MILWAUKEE 1, U. S. A.

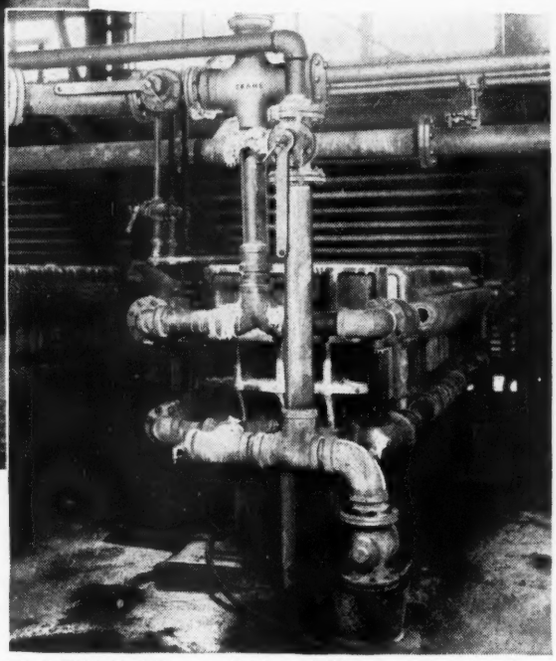
ALLIS-CHALMERS
HD-19
It's Rugged and Tough
— Built to Outproduce
and Outlast!

For better piping every time
get everything from CRANE



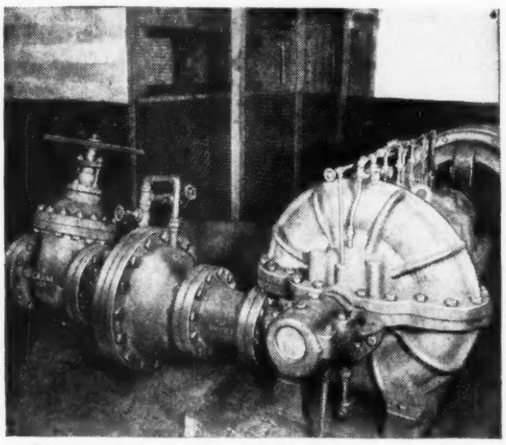
IN A COPPER MINE . . . *Crane standard 125-pound iron gate and check valves and flanged fittings in 16-in. return water lines from pumps to concentrators.*

ONE
SOURCE OF SUPPLY
RESPONSIBILITY
STANDARD OF QUALITY



IN A ZINC PLANT . . . *a battery of filter presses equipped with screwed and flanged piping materials from the complete Crane line.*

IN A COAL MINE . . . *one order to Crane gets all valves, fittings, and pipe for this typical centrifugal water pump hookup.*



Get everything from Crane . . . valves, fittings, pipe, accessories, shop-fabricated units. That's the easy way to help yourself to better piping performance. And to speed up and simplify every new or replacement installation for mine service . . . below or above ground.

By standardizing on Crane for everything in piping equipment, you get this 3-way advantage:

ONE SOURCE OF SUPPLY offering the world's largest selection of steel, iron, brass, and alloy piping materials for all power, process, and general service applications.

ONE RESPONSIBILITY for piping materials—helping you to get the best installation, and to avoid needless delays on the job.

OUTSTANDING QUALITY in every item—assuring uniform dependability and durability throughout piping systems.

Nearby, there's a Crane Branch or Wholesaler to give you quick, modern service . . . on everything for better piping . . . and all on one order.

CRANE CO., 836 S. Michigan Ave., Chicago 5, Ill.
Branches and Wholesalers Serving All Mining Areas.

EVERYTHING FROM . . .

VALVES
FITTINGS
PIPE

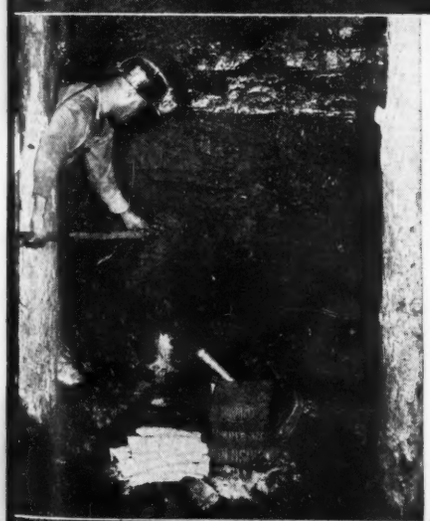
CRANE

PLUMBING
AND
HEATING

FOR EVERY PIPING SYSTEM

Wet work no problem for "MONOBEL"* AA

... a Du Pont Permissible that Helps Get Out More Big Lump Coal—Faster



Holes in top-cut heading of an extremely wet mine in Alabama are successfully loaded and shot with "Monobel" AA—the ideal, all-round permissible. Miners appreciate water-resistance of this popular permissible.

Miner (at left) loads "Monobel" AA in slate rock between two seams of coal in face 102 inches high.

Result of blast (below) proves "Monobel" AA produces big lump coal—not shattered—right up near the face. Mechanical loaders can get at it easily, quickly, efficiently. Face and ribs are square-sheared. Class A fumes allow quick return to the working place.

On a recent service call, Du Pont Technical representative reported: "Management here is one of best 'Monobel' AA boosters." Why not try it in your own mine? See for yourself why "Monobel" AA is today's best-selling permissible.

*Reg. U. S. Pat. Off. Trade Mark for Du Pont low-velocity ammonia permissibles

E. I. DU PONT DE NEMOURS & CO. (INC.)
Explosives Department, Wilmington 98, Del.

DU PONT "MONOBEL" AA

A Product of Du Pont Explosives Research

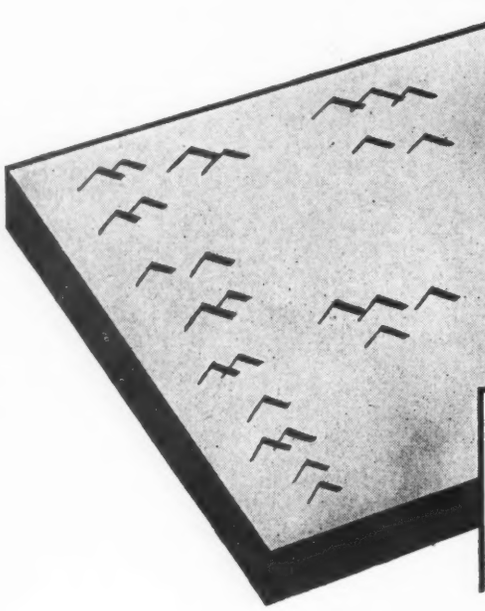
DU PONT
REG. U. S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING ... *THROUGH CHEMISTRY*

(*Listen to* "CAVALCADE OF AMERICA"—
Monday evenings 8 p. m.—N.B.C. Stations)

UNION PACIFIC

TREASURE MAP OF INDUSTRY



Wyoming

- ☆ VAST SUPPLY OF COAL, IRON AND PETROLEUM
- ☆ LEADING LIVESTOCK STATE
- ☆ TREMENDOUS WOOL CLIP
- ☆ IMPORTANT MARKETING CENTER OF POULTRY AND DAIRY PRODUCTS
- ☆ LARGE PRODUCER OF SUGAR BEETS, POTATOES AND GRAINS
- ☆ EXCELLENT TRANSPORTATION
- ☆ OUTSTANDING SCENIC AND RECREATIONAL ATTRACTIONS
- ☆ HEALTHFUL LIVING CONDITIONS

One of a series of advertisements based on industrial opportunities in the states served by the Union Pacific Railroad.

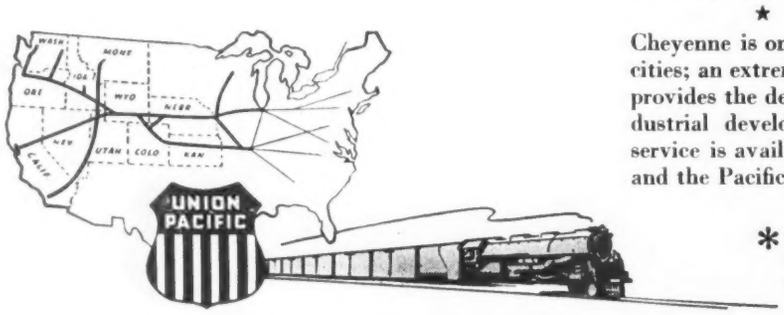
In Wyoming manufacturers will find a vast amount of raw materials. It is a leading state in potential mineral resources; produces great quantities of iron . . . has the world's largest untapped supply of coal. Copper, silver, gold, lignite and bentonite are among the mined metals and minerals. The State contains 27 oil fields and large timber lands.

Wyoming is one of the greatest of livestock States, producing fine beef cattle. Its wool clip is tremendous. Poultry raising and dairying are important activities. Principal crops are sugar beets, potatoes and grains.

The healthful climate . . . scenic and recreational attractions such as Yellowstone-Grand Teton National Park and scores of dude ranches . . . a fine educational system . . . are incentives to living in this western region.

★ ★ ★ ★

Cheyenne is one of the principal Union Pacific mainline cities; an extremely important point to the railroad which provides the dependable transportation so essential to industrial development. For travelers, daily Streamliner service is available from Cheyenne to and from Chicago and the Pacific Coast.



✻ *Address Industrial Department, Union Pacific Railroad, Omaha 2, Nebraska, for information regarding industrial sites.*

UNION PACIFIC RAILROAD

THE STRATEGIC MIDDLE ROUTE

Kennametal Bits

Speed Cutting, Speed Drilling Lower Costs 5 Ways

Kennametal cutting machine bits are made in 8 styles to fit standard chains.

Kennametal drill bits are made in 8 sizes for hand-held, post and mounted drills.

A time and cost survey on Kennametal bits shows that in 9 out of 10 coal seams Kennametal bits reduce preparation time per place and lower the bit cost per ton for both cutting and drilling.

The five big advantages Kennametal bits bring you according to the findings of the survey are:

1. **Fewer bit changes.**
2. **Faster cutting and drilling.**
3. **Lower power consumption.**
4. **Less sharpening and haulage.**
5. **Lower maintenance cost on the machine.**

Kennametal has a hard, wear-resistant cutting edge plus the ability to take the shock of hitting hard material in the seam. It lasts far longer than ordinary steel—frequently outwearing it 100 times and more. Its ability to stay sharp reduces preparation time per place 25% to 40%, and the amount of time spent changing ordinary bits sometimes costs five times as much as the initial cost of Kennametal.

Send for our new booklet 47-M1 on "Speedier Face Preparation and Less Bit Cost Per Ton." This booklet gives performance facts and has coverage over 15 different coal seams and 15 types of rock.

KENNAMETAL

MINING DIVISION

KENNAMETAL INC., LATROBE, PA., U. S. A.

One Glance Tells You that

Only the SIDE of a V-Belt TOUCHES the Pulley

Diagram of V-Belt in Sheave Groove

The *SIDE* Does ALL the GRIPPING That's Why it *GETS the WEAR!*

One glance at a V-Belt in its sheave shows you that only the sides of the belt *touch the pulley*. Every ounce of load the V-Belt carries must first be picked up by the sides. The sides do all the *gripping*—they get all the *wear* against the sheave groove wall. They pick up the load. They transmit that load to the belt as a whole. Then, once again, the sides—and the sides *alone*—grip the driven pulley and deliver the power to it.

Naturally, this explains why you have always noticed that the sidewall of the *ordinary* V-Belt is the part that *wears out first.*

★Now See How the Patented CONCAVE SIDE SAVES Sidewall Wear—Lengthens Belt Life!

Because the life of a V-Belt depends, first of all, on the sidewall, it is clear that anything which prolongs the life of the sidewall will lengthen the life of the belt. The simple diagrams on the right show exactly why the ordinary, straight-sided V-Belt gets excessive wear along the *middle* of the sides. They show also why the Patented Concave Side greatly reduces sidewall wear in Gates Vulco Ropes. That is the simple reason why your Gates Vulco Ropes are giving you so much longer service than any straight-sided V-Belts can possibly give.

★Longer Sidewall Wear Is MORE IMPORTANT NOW Than Ever Before!

Now that Gates *SPECIALIZED* Research has resulted in Super V-Belts capable of carrying much heavier loads—up to 40% *higher horsepower ratings* in some cases—the sidewall of the belt is called upon to do even *more work* in transmitting these heavier loads to the pulley. Naturally, with heavier loading on the sidewall, the life-prolonging Concave Side is more important NOW than ever before!

4710

The CONCAVE SIDE is a GATES PATENT

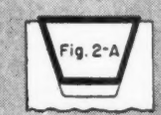
Straight Sided V-Belt

How Straight Sided V-Belt Bulges When Bending Around Its Pulley

You can actually feel the bulging of a straight-sided V-Belt by holding the sides between your finger and thumb and then bending the belt. Naturally, this bulging produces excessive wear along the middle of the sidewall as indicated by arrows.

Gates V-Belt with Patented Concave Sidewall

Showing How Concave Side of Gates V-Belt Straightens to Make Perfect Fit in Sheave Groove When Belt Is Bending Over Pulley.



No bulging against the sides of the sheave groove means that sidewall wear is evenly distributed over the full width of the sidewall—and that means much longer life for the belt!

THE GATES RUBBER COMPANY DENVER, U. S. A., *"World's Largest Makers of V-Belts"*

GATES VULCO ROPE DRIVES

Engineering Offices and Jobber Stocks IN ALL INDUSTRIAL CENTERS of the U. S. and 71 Foreign Countries

Gates

THE MARK OF SPECIALIZED RESEARCH

CARDOX

"THE NON-EXPLOSIVE MINING METHOD"

WILL NOT SUPPORT COMBUSTION
CAN NOT INITIATE AN EXPLOSION

CARDOX mining assures maximum safety *throughout* face preparation. The discharge of a CARDOX Tube has never been known to ignite either gas or dust. Carbon dioxide, which provides the force used by CARDOX to dislodge coal is a fast, effective fire extinguishing medium. In many mines CARDOX Tubes are featured as emergency fire extinguishers. In addition to reducing fire and explosion hazards, CARDOX provides a mild heaving, shearing action that squares up both face and rib so that dangers resulting from overhanging face in high seams are greatly reduced.

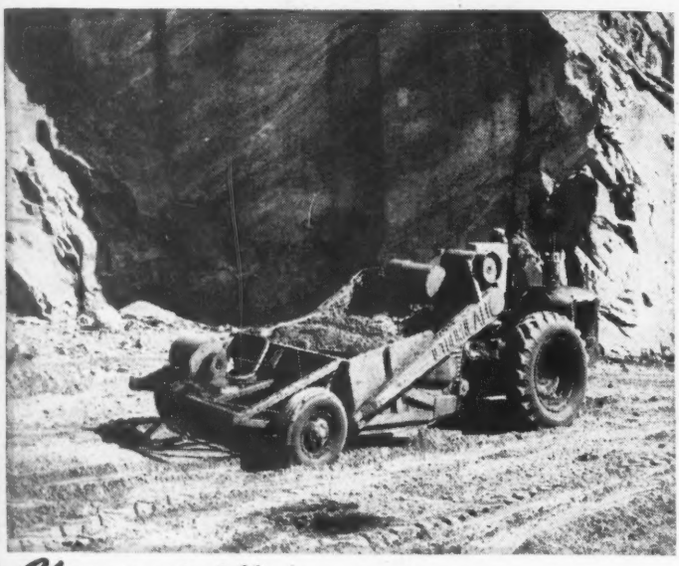
Write for full details on free demonstration of CARDOX safety and profit features in your own mine.

CARDOX CORPORATION • BELL BUILDING • CHICAGO 1, ILLINOIS

Get orders in now for Mine superintendent's

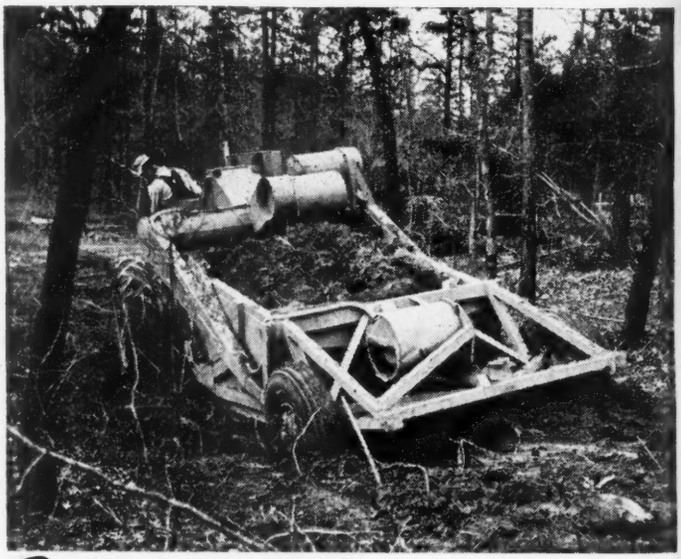
Takes care of drainage

This handy one-man Tournapull opens drainage ditches, builds dams . . . removes slides. Works anywhere . . . on the bank or in the pit. Big rubber tires protect coal. Handyman around both underground and open pit operation. Can handle odd job dirtmoving for several adjoining mines.



Cleans up pits

When this versatile 3-yard Scraper outfit isn't busy on other jobs it can be used effectively for cleaning out ahead of coal loader. Goes anywhere around the place on or off roads and will haul oil drums, repair parts . . . besides doing maintenance and housekeeping chores.



Builds access roads

On small cut and fill jobs, **one man** with a D Tournapull can handle complete job . . . rough grading, finishing, ditching and graveling . . . all in minimum time. Goes through mud and sand where trucks would stall. Travels job-to-job at 23 m.p.h either on highway or cross country.

Tournapull—Trademark Reg U S Pat Off 8115Cm

LETOURNEAU EQUIPMENT

See your Le Tourneau Distributor NOW for complete information

NEW D TOURNAPULL handyman ....

Stockpiles...disposes of waste

This handy self-powered scraper can handle coal stockpiles, move waste from the tipple, and clean up coal spillage. Big tires compact coal without crushing . . . reduce danger of spontaneous combustion. Many consumers now stockpile their coal by using the modern Tournapull method.

Works gravel pits

One man strips, loads, hauls, and spreads gravel on mine roads hauling from local roadside pits. Can also load from stockpile and spread any type of surfacing material including crushed stone. One unit can work alone or several can be operated as a fleet.

Maintains railroad trackage

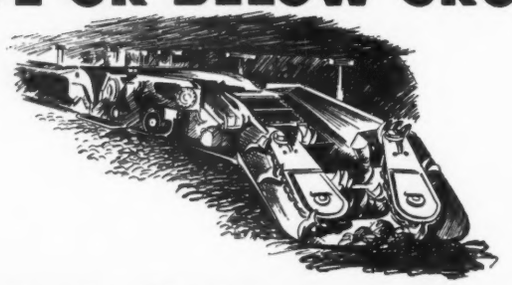
Cuts back banks, cleans drainage ditches, removes slides and fills washouts. Ideal for building new sidings or short spur tracks quick. Handles complete excavating job . . . grade, drain and spreading ballast. Crosses track at will. Many railroads use Tournapulls.

Maintains haul roads

Makes quick repairs anytime, anywhere. Fills washouts . . . cuts down grades . . . loads, hauls, spreads surfacing. No trailer or hauling unit needed. Can travel anywhere under its own power. One man does the entire job. Moves in, does the job, goes on to the next assignment.

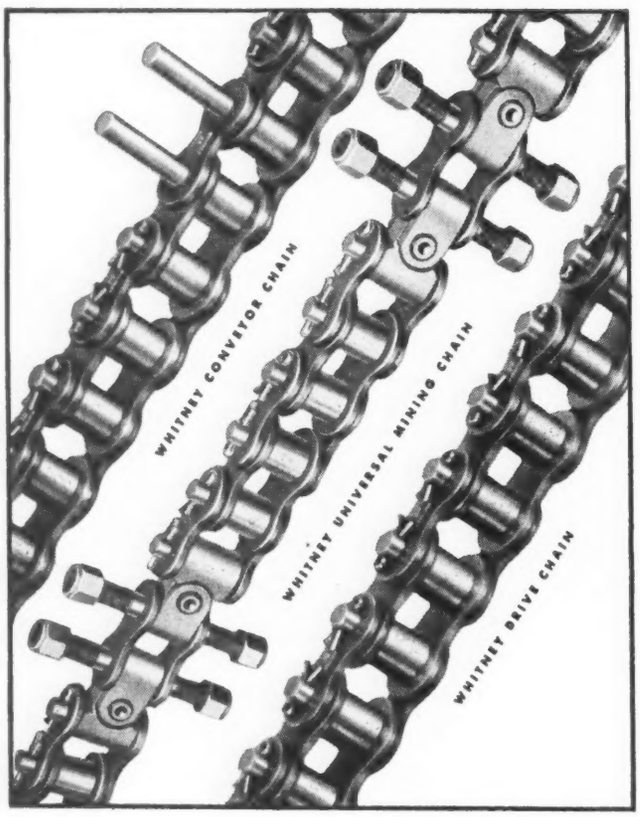
LETOURNEAU PEORIA, ILLINOIS — HIGH-SPEED UTILITY — TOURNAPULLS

ABOVE OR BELOW GROUND



WHITNEY CHAIN DRIVES

are tonnage producers



Whitney chain . . . loader, conveyor or drive . . . is one investment that will pay out daily profits.

Made of selected heat-treated alloy steel, these tough, rugged chains keep equipment producing on schedule. They stand up under the severest of operating conditions . . . resisting shock loads without breakage. Whitney Chain Drives help give you lowest cost-per-ton production wherever they are used . . . in the preparation plant or up-at-the-face.

Accurately designed Whitney Cut Tooth Sprockets complete the combination for overall drive efficiency. Like Whitney Chains they are made to insure smooth operation and give long wearing life.

Standardize on Whitney Chains and Cut Tooth Sprockets . . . the all-steel drives . . . and you'll get greater output and less down time.

THE WHITNEY CHAIN & MFG. COMPANY

Your Assurance of Proven Power, Transmission and Conveying Since 1896

HARTFORD 2, CONNECTICUT

4 MILLION HP CONFIRMS IT

FOR TOUGH MOTOR JOBS, YOU CAN'T BEAT

TRI/CLAD EXTRA PROTECTION

To date, a million and a half Tri-Clad motors, with a total output of over 4-million horsepower, have been purchased by American industry!

In every kind of plant from steel mill to dairy, these motors are proof beyond doubt that you can't beat Tri-Clad extra protection for tough motor applications. Even on jobs where special protective enclosures would ordinarily have been specified, Tri-Clad open motors, applied during the war years, have stood up to heat, dust, and dampness, operating smoothly and efficiently for years with only minimum maintenance.

Today, the Tri-Clad motor family includes many different types and sizes. But whatever your selection, the Tri-Clad motor nameplate is still your best assurance of a high return on your motor dollar. *Apparatus Dept., General Electric Company, Schenectady 5, N. Y.*

EXTRA PROTECTION . . . AGAINST PHYSICAL DAMAGE!

Rigid cast-iron frame and end shields protect vital motor parts from external abuse. Because they're not at the mercy of a coat of paint, they strongly resist chemical attack and dampness. Cast iron also gives you wide, nonyielding fits between end shields and frame for ease of assembly.

EXTRA PROTECTION . . . AGAINST ELECTRICAL BREAKDOWN!

Motor windings of Formex* wire, together with improved insulating materials, reduce the chances of electrical failure. Heat is dissipated quickly —motor stays young for years and years!

EXTRA PROTECTION . . . AGAINST OPERATING WEAR AND TEAR!

Bearing design affords longer life, greater capacity, improved lubrication features. Bearing seals retain lubricant, keep out dirt. One-piece, cast-aluminum rotor is practically indestructible.

**Trade-mark Reg. U.S. Pat. Off.*

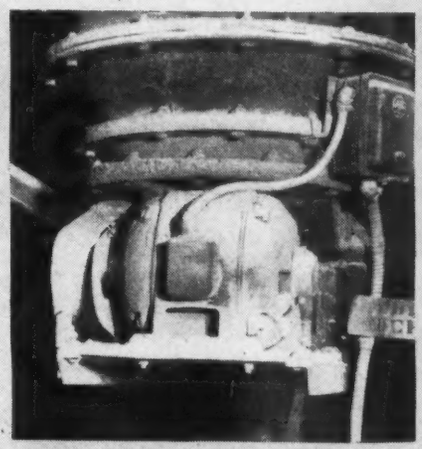
The toughest TRI/CLAD ever built!

Newest addition to the Tri-Clad motor family is the Tri-Clad totally enclosed, fan-cooled motor for use in adverse atmospheres. It gives you these important construction features:

- *A cast-iron, double-wall frame which completely encloses and protects the windings and punchings.*
- *A nonshrinking compound around motor leads which protects motor interior from dust and moisture.*
- *A rotating labyrinth seal which further protects the motor interior from damage by foreign matter.*

GENERAL ELECTRIC

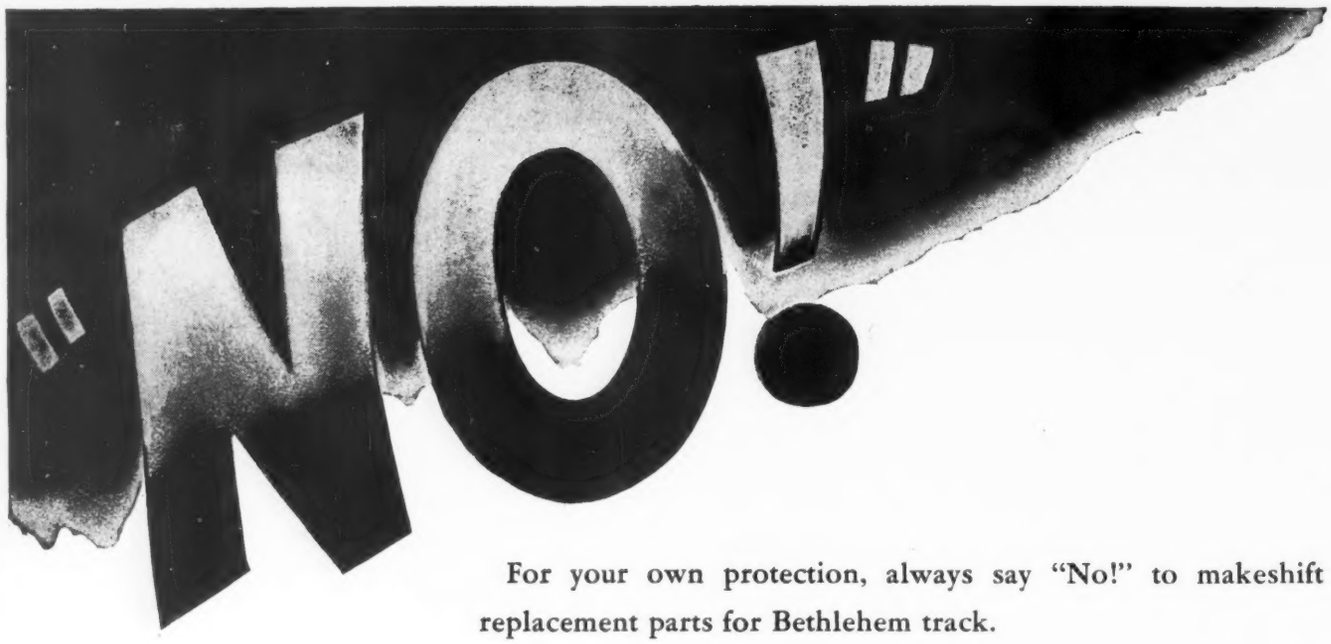
750-287C



THE ALUMINUM ORE COMPANY operates one of the world's largest hydrofluoric acid plants at East St. Louis, Ill. It is a modern plant and uses many electric motors in its highly mechanized materials-handling systems. As a rule, special protective enclosures are used to keep out fumes and dust. But in this case the Tri-Clad open (dripproof) motor you see here has been in service for five years without a single failure. It has operated continuously —24 hours a day, seven days a week. Yet the only maintenance required has been periodic inspection and lubrication. Behind the unusually fine service record of this motor is the extra protection built into every Tri-Clad motor. It's in there for keeps to give you better motor performance at lower cost.

TRI/CLAD
REG. U.S. PAT. OFF.
MOTORS

- OPEN (DRIPPROOF)
- TOTALLY ENCLOSED
- EXPLOSION - PROOF



For your own protection, always say "No!" to makeshift replacement parts for Bethlehem track.

Every part of a Bethlehem prefabricated track system is designed to do a certain job and do it well. Rails are cut to exact lengths and precurved to proper radii in Bethlehem's own shops. Frogs, switches, switch stands, rods, joints, and other components are made to fit an integrated layout that has been carefully planned and designed for the individual customer.

Substitutions of "home-made" parts, or those of another make, should be discouraged. This is not said in disparagement; it is simply that a Bethlehem replacement part will naturally do the best job in a Bethlehem "planned" track system.

That's just common sense.

By insisting on Bethlehem replacements for Bethlehem track, you help maintain the high efficiency of your layout. You help prevent derailments and subsequent haulage delays. It's a simple precaution and it *pays!*

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

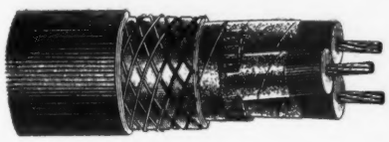
On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation

Export Distributor: Bethlehem Steel Export Corporation

★ BETHLEHEM STEEL ★

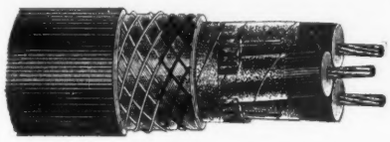
Remember...

Bethlehem parts for Bethlehem track equipment



Type W

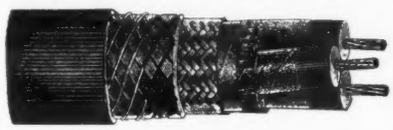
TIREX High Tension Cables, Type W, have neither shielding nor ground wires. They are not recommended for service exceeding 2500 volts but can be supplied for voltages up to 5000.



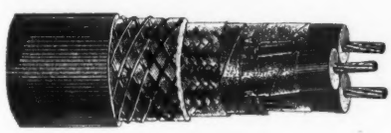
Type G

TIREX High Tension Cables, Type G, are comparable to Type W but for the addition of ground wires. Providing a means for properly grounding equipment, they prove satisfactory for most uses up to 5000 volts operation.

TIREX High Tension Cables, Type SH, represent the most advanced improvements in high-voltage portable cable construction. All types include a braided copper shielding applied either over the individual conductors or over the assembled conductors. Ground wires should be used when it is necessary to ground equipment through the cable to a permanent ground.

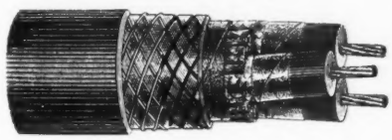


Type SH-B

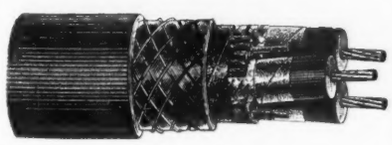


Type SH-C

Types SH-B and SH-C are designed to afford protection to crews handling the cable when in service.



Type SH-A



Type SH-D

Types SH-A and SH-D fulfill the same purpose and also reduce internal electrical stresses, thus increasing the life of the cable.

SIMPLEX-TIREX

HIGH TENSION CABLES

FOR STRIP MINING MACHINERY

TIREX High Voltage Cables are not "newcomers" to the industry. For many years they have provided dependable and economical service on all types of portable electrical equipment. Yet they are modern cables, designed to transmit power — with efficiency and safety — to Modern Mining's shovels, cranes, and other heavy machinery.

A durable and electrically stable insulation and a reinforced jacket of tough Selenium Neoprene that's cured in lead contribute the features that make the name TIREX synonymous with lasting, trouble-free performance and safe operation.

In particular types, as shown, the application of ground wires and shielding assures especially-safe handling where conditions demand extra protection.

The Simplex representative in your area will be glad to help you select the type and size that will best meet your specifications.

Simplex-Tirex

SIMPLEX WIRE & CABLE CO.

79 SIDNEY ST., CAMBRIDGE 39, MASS.

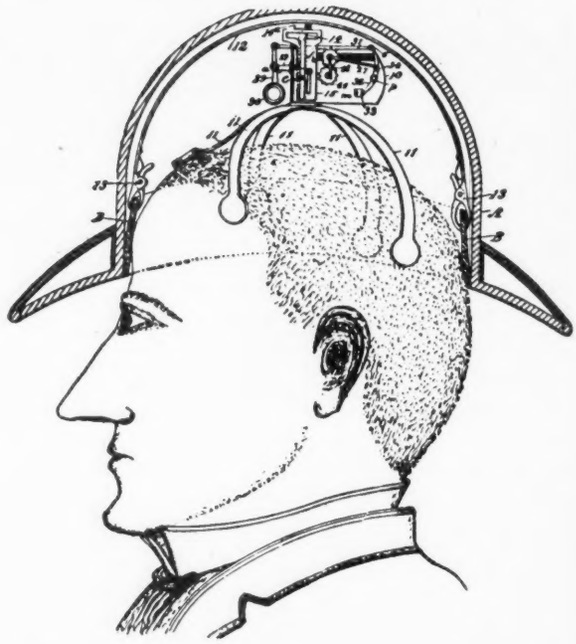
"He Tips His Hat To The Ladies!"

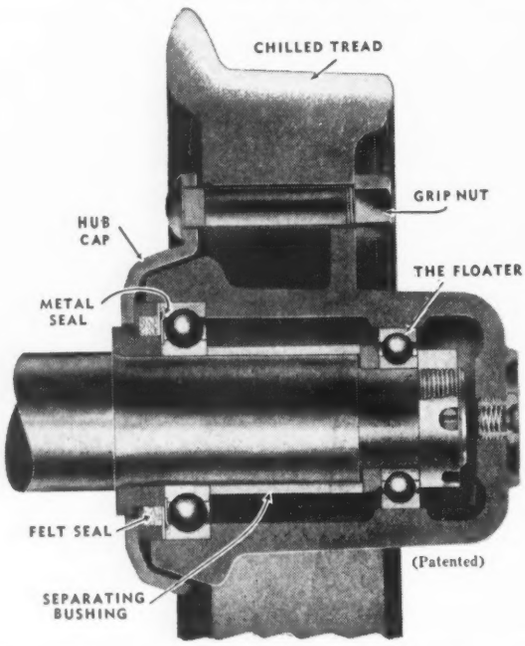
FAMOUS U. S. ISSUED PATENTS NO. 8 OF A SERIES SALUTING DEVICE

No. 556,248 Patented March 10, 1896

" . . . This invention relates to a novel device for automatically effecting polite salutations by the elevation and rotation of the hat on the head of the saluting party when said person bows to the person or persons saluted, the actuation of the hat being produced by mechanism therein and without the use of the hand in any manner."

(Language inside quote marks taken directly from U. S. Patent)





S-D "Floater" Wheels . . . Grease 'Em Once Every Five Years

Yes, the "Floater" is the wheel that "hates to be greased". They're so smooth-running that you'll think your cars are floating, and you can actually increase your load hauled by locomotive 50 percent. There is a big savings in electricity. "Floater" wheels are guaranteed against breakage or bearing failure for 5 years. You will tip your hat to "Floaters."

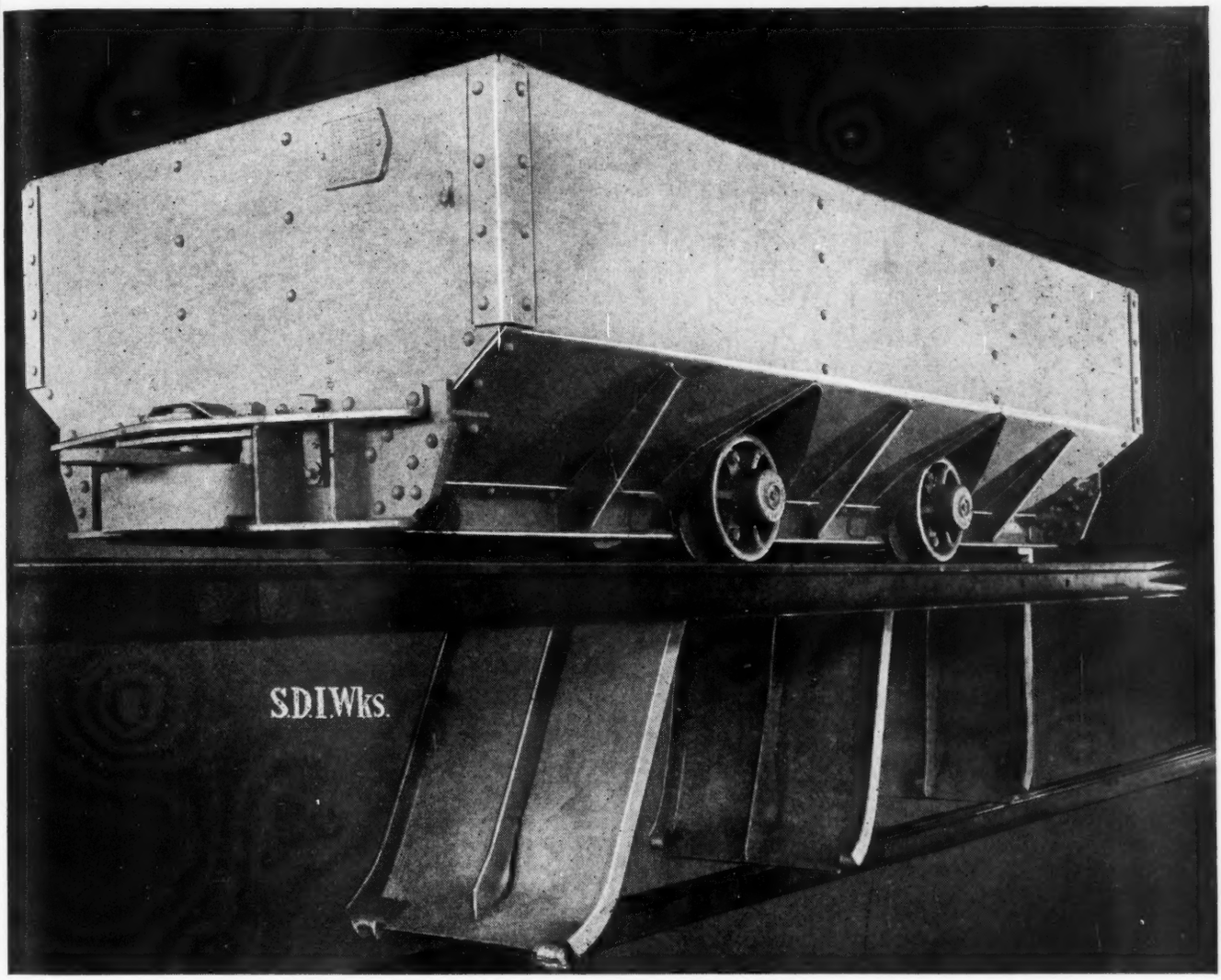
★ **Who wouldn't tip his hat to a money-maker like these big, efficient S-D "Automatics"? Immediately they start piling up profits. Wise operators junk obsolete cars that have been slowing down production, using excess labor, and piling up big maintenance bills.**

S-D "Automatics" are made in 4 and 8 wheel models, and in capacities from 1 to 40 tons. They're engineered and manufactured for rugged service that averages 15 to 20 years. They are lighter . . . with bigger capacities for over-all dimensions. The percentage of dead weight is at a minimum. Also, they lead an easy life, because, when dumping, you don't stand them on end, or roll them over. You don't even have to uncouple them. Mine records show that you can dump fifty or more tons of coal per minute . . . automatically . . . gently . . . with a minimum of lump-breakage. The 1-2-3 doors lay the coal down in sloping layers.

20 Car loads of "Automatics" from—

SANFORD-DAY IRON WORKS, Inc. • Knoxville 9, Tenn.

MINE OPERATORS TIP THEIR HATS TO S-D 1-2-3 "AUTOMATICS"!



No latch lever bars sticking out sideways to get bent and cause trouble. The new S-D "Automatics" are equipped with a remarkable new device that unlatches the doors from underneath the car. This tripping device engages the latch hooks directly and pushes them back as the car moves forward. Two latch hooks are used for extra safety and extra support. Both ends of the car are now alike — clean and free of trouble-making devices. Many operators tell us that this is the most important improvement in "Automatics" since we introduced them in 1917.

Forget About Investment! You can LEASE S-D "Automatics"!

Yes, you can have all the advantages of S-D "Automatics" without buying the cars. Over an average period of 15 years, the cost of leasing the cars averages less than 2 cents a ton for the coal handled in the car. At any time during the contract you can purchase the cars at a price that steadily reduces after each lease-payment. For further information on this liberal leasing plan write, call or wire us. We will delight in giving you full particulars on the lease or purchase of S-D 1-2-3 "Automatics" without obligation. A wonderful proposition. We lease about 50% of our automatics.

20 Car loads of "Automatics" from—

SANFORD-DAY IRON WORKS, Inc. • Knoxville 9, Tenn.

BOWDIL FABRI-FORGED CUTTER BARS AND CHAINS

YOUR COAL MINING OPERATIONS must become increasingly efficient if you are to make money in spite of rising costs and competitive power resources. Bowdil has anticipated the need for improved machinery to get out the tremendous tonnages demanded in the coming years. In pit tests, under all imaginable conditions, Bowdil has proved superiority of a new design in coal cutting machinery.

NOW—ready for immediate delivery—Bowdil presents the advanced equipment you must have for profitable, progressive coal mine operation.

The critical operating part of coal mining machinery is the chain carrying the cutter bits. Bowdil has perfected a unit that eliminates the five common shortcomings of chains in general use today. The Bowdil Fabri-Forge Chain design features these improvements:

1—TRUE-RUNNING TRACK GUIDE. Bowdil's radial track guide makes chain circle the head at correct angle. Smooth, wobble-free run prevents damage to guide or wearing strips. **2—NO WEAK LINKS.** Bowdil's drop forged lug body and symmetrical connector are of equal strength . . . built with a margin of resistance for many times the normal load. **3—EASY MAINTENANCE.** Bowdil's Fabri-Forge Chain is easy to connect, remove or replace. Large locked hardened pin and bushing take the wear. **4.—FITS YOUR JOB.** Bowdil's bit-carrying body is securely welded on chain to meet any condition or requirement for position, lacing or kerf.

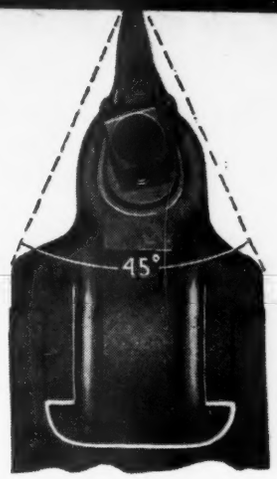
5—REDUCES OPERATING COST. Bowdil's one-piece holder, wedging bit securely in lug projection, can be quickly and economically inserted. No need to halt production for complete chain replacement. Make unit repairs fast—and get back to work!

• Approved by mine operators everywhere. Shoulders on lugs and links carry the load and shock, distributing stress . . . lengthening the life and efficiency of the entire cutting end of mining machines.

• Simple, ingenious rivet lock principle is assembled quickly, holds securely and comes out easily when you want the chain apart.

BOWDIL

COAL CUTTING EQUIPMENT



BOWDIL

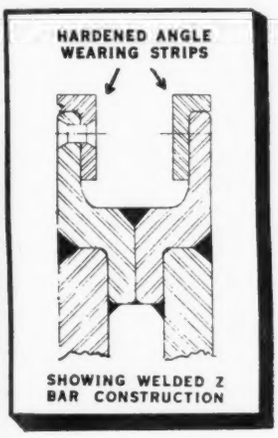
CONVENTIONAL

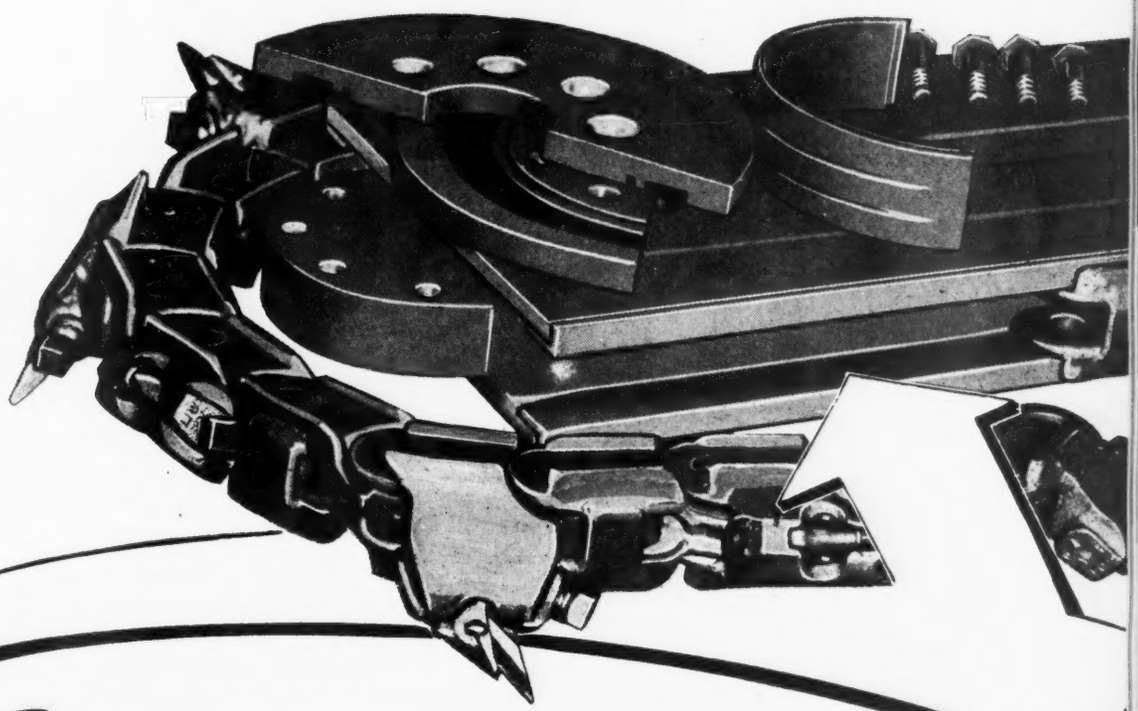
1—BEARING SURFACES INCREASED

2—LEVERAGES REDUCED OVER ONE HALF

3—DEFLECTION STABILIZED

With Bowdil's famous Concave Cutter Bits in the holders, this equipment will definitely prove operating economy for you.





This bar represents Bowdil's latest effort in design of the cutting end of mining machines to meet the present day demands for Strength, Power Saving and Coarse cutting.

- No rivets are used in the body of the Bowdil Cutter Bar or chain, thus retaining full material strength. It is a known fact that numerous rivet holes weaken the material.
- Actual tests made by exerting measured pressure between 3' centers show—Conventional bars 4" thick will bend with 25 to 35 tons. Bowdil Z bars 3" thick will bend with 40 to 50 tons.
- These bars being made from high physical alloys will not kink—insuring long, efficient service. Standardization enables us to make good delivery on bars for all types of machines.

The BOWDIL COMPANY

CANTON 4, OHIO

NOW "VENTUBE" IS MADE WITH NEOPRENE..

Tough, durable neoprene coating makes flexible ventilating duct even better than prewar type!

- LIGHTER IN WEIGHT
- MORE FLEXIBILITY
- EASIER TO COUPLE
- STANDS UP TO ACID
- RESISTS HEAT, AGING

We're glad we can now give you more value in your "Ventube"* than ever before—with tough, durable neoprene, the Du Pont synthetic rubber that gives such unusual service in conveyor belts, cable-jacketing and other equipment. "Ventube" is now coated with neoprene, and the "Ventube" fabric is thoroughly impregnated with a neoprene composition engineered to give long life and trouble-free service.

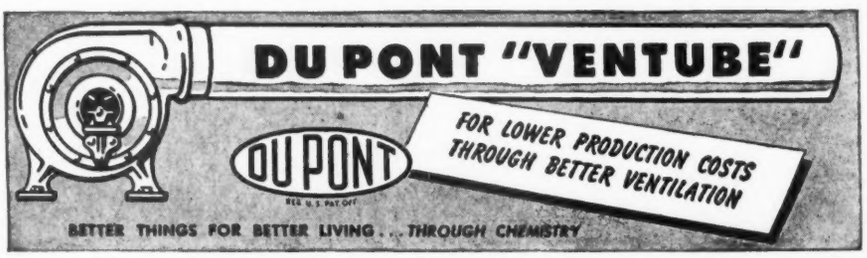
Many advantages of the new material: (1) Much more flexible for carrying air around curves and corners, for coupling and uncoupling; (2) Much lighter in weight, for lifting and carrying long lengths, and (3) Neoprene is long-lasting, withstands corrosive acid or alkali waters, resists oxidation from heat and aging. Not only better than wartime types, but even better than prewar "Ventube."

And remember that regular "Ventube," attached to a motor-driven blower fan of adequate capacity, delivers fresh air to men at work and that bad air and dust can be drawn off by the use of helical-type "Ventube" attached to a motor-driven exhaust fan. "Ventube" keeps temperatures low enough for efficiency, reduces down-time after blasting, speeds production in many ways, cuts accidents. It is easy to install, to move, to store. Low in both original and upkeep cost.

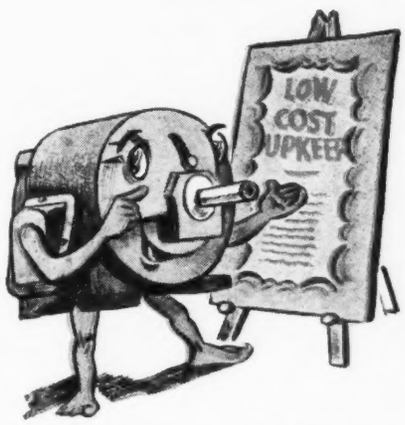
For further details, consult Du Pont Technical Service, Fabrics Division, E. I. du Pont de Nemours & Co. (Inc.), Fairfield, Conn.

• • •

*"*Ventube*" *is Du Pont's registered trademark for its flexible, synthetic-rubberized ventilating duct.*

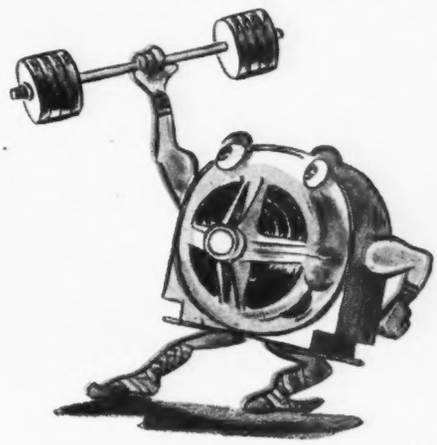

DU PONT "VENTUBE"
DU PONT
REG. U.S. PAT. OFF.
FOR LOWER PRODUCTION COSTS THROUGH BETTER VENTILATION
BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

"Puzzled over which type of motor to buy?"



In 80% of the Cases, open squirrel-cage induction motors meet the need. They fit most drives, and can be obtained in numerous standard and special designs to meet varying conditions of starting torque, slip, etc. They are also the most economical type to buy and to maintain. Allis-Chalmers builds induction motors in sizes from ½ to 10,000 hp — or higher, if needed.

For Tough Starting Conditions, wound-rotor induction motors are recommended. Their high starting torque, at comparatively low starting current, and their controllable speed characteristics are desirable in drives for conveyors, grinding mills and other tough starting assignments. Compact, accessible Allis-Chalmers wound rotor induction motors range in size from 5 to 10,000 hp.



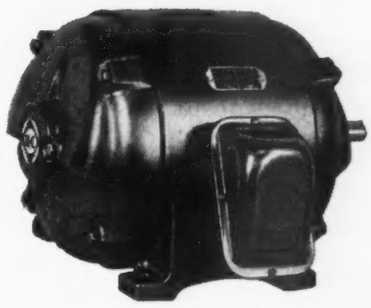
For Slow Speed, direct-connected drives as low as 75 rpm, or other constant speed applications at higher rpm, synchronous motors are a good solution. They are of particular benefit when a system's power factor is low, since they can be furnished for operation at either unity or leading power factor. From 40 hp to 50,000 hp and higher — in bracket bearing, pedestal bearing, or engine types.

Is d-c Available? Then adjustable speed operation is easily obtainable. Allis-Chalmers builds d-c motors from ½ to 10,000 hp and higher — for constant or adjustable speed duty in ranges of 6:1 and lower. By means of a source of d-c voltage, adjustable speed motors may also be designed to operate over a speed range as high as 30:1. Suitable for fans, elevators, etc.

Select from the Complete Allis-Chalmers Line!

NOT JUST FOLLOWING popular choice and using a standard squirrel cage induction motor. But the *right* motor for economy and efficiency.

That means an overall knowledge of *all* types of motors . . . their operation . . . limitations . . . maintenance. And there's where your A-C representative can be a big help. His recommendations are backed by experience . . . and the Allis-Chalmers motor he selects is *itself* backed by 50 years of experience in motor design and building. ALLIS-CHALMERS, MILWAUKEE 1, WIS. A 2304



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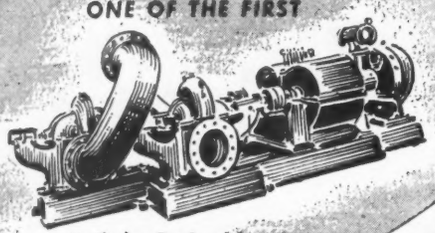
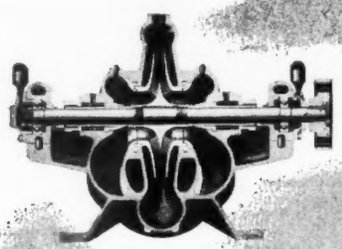
Biggest of All in Range of Industrial Products

45 Years of PUMP IMPROVEMENT

ONE OF THE FIRST

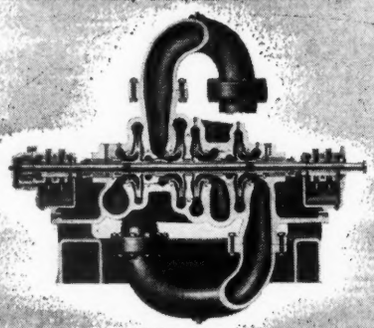


Built by De Laval in 1902

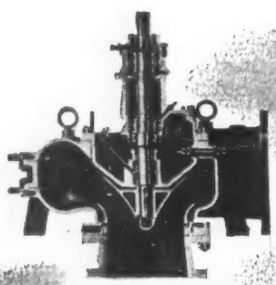


SINGLE STAGE, DOUBLE SUCTION PUMP

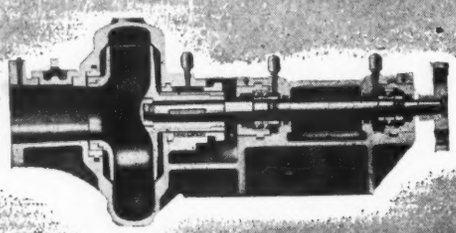
Modern De Laval centrifugal pumps represent the culmination of more than 45 years of continual improvement and perfection. This long period of concentration upon the problems of centrifugal pump design and application places at the user's command a complete line of modern, high quality pumps and a vast store of knowledge concerning pump application problems.



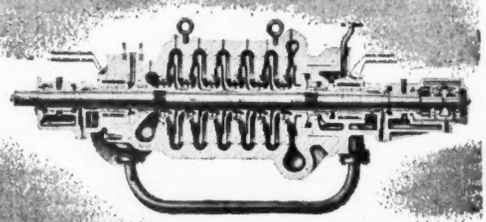
FOUR STAGE, OPPOSED IMPELLER PUMP



MIXED FLOW PUMP



CLOGLESS PUMP



HIGH PRESSURE, MULTI-STAGE PUMP

GP-1

TURBINES • HELICAL GEARS • WORM GEAR SPEED REDUCERS • CENTRIFUGAL PUMPS • CENTRIFUGAL BLOWERS AND COMPRESSORS • IMO OIL PUMPS

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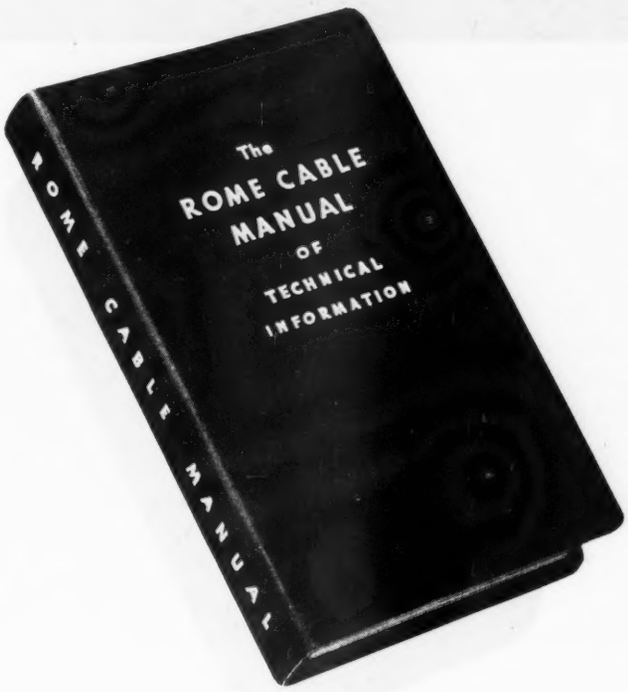
THIS MANUAL WILL HELP YOU SOLVE ELECTRICAL PROBLEMS IN YOUR MINE



Rome Cable has long recognized the need for technical help for the coal mines . . . based on intimate knowledge of mine electrical problems, backed by competent research and engineering development.

The Rome Cable manual is offered as a complete and up-to-date compilation of technical data. To the chief electrician, electrical and mining engineer, master mechanic it will be an invaluable working tool. Published in handy pocket size, it consists of 250 pages of helpful, time-saving tables, data and calculations.

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dependable, SAFE haulage power

Ask a user of EDISON Nickel-Iron-Alkaline Batteries what he thinks of them as power units for locomotives and shuttle cars. The chances are he'll say they provide the closest approach to failure-free uninterrupted haulage power he knows of—and are economical, too.

He may at some time have had a wreck—such as a locomotive falling into a shaft or rolling down the side of a waste dump—and found that the battery not only survived with little or no damage but later went on and delivered full service life.

EVEN "WORN-OUT" BATTERIES ARE USEFUL

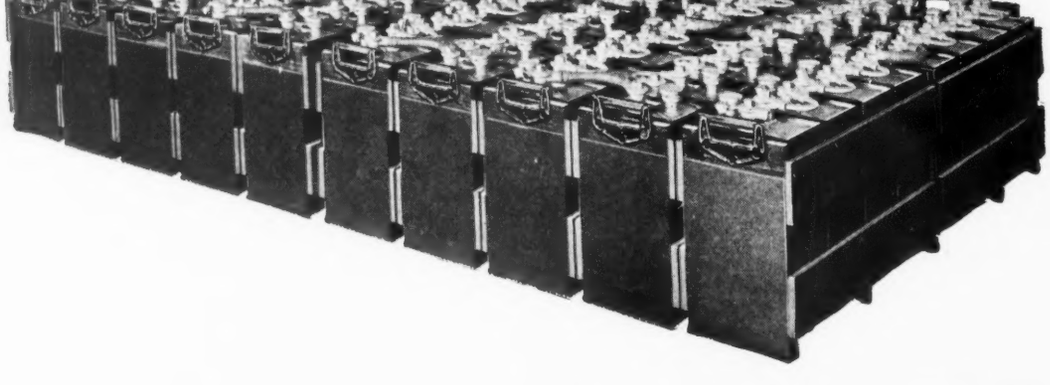
Or, he may have discovered that he can use "worn-out" motive power batteries for various kinds of lighter-duty standby work for which their capacity is still ample, and thus can get more years of dependable service from them.

As a matter of fact, it is only by actually using EDISON Nickel-Iron-Alkaline Batteries that a person finds out how dependable and economical they really are. *Edison Storage Battery Division of Thomas A. Edison, Incorporated, West Orange, N. J. In Canada: International Equipment Company, Limited, Montreal and Toronto.*

In Mine Locomotives and Shuttle Cars EDISON Nickel-Iron-Alkaline Batteries Give You These Important Advantages

- ★ They are **durable mechanically;** grids, containers and other structural parts of the cells are of steel; the alkaline electrolyte is a preservative of steel.
- ★ They are **foolproof electrically;** are not injured by short-circuiting, reverse charging or similar accidents; are free from self-deteriorating reactions.
- ★ They can be **charged rapidly;** do not require critical adjustment of charge rates; can be charged directly from mine d-c supply.
- ★ They **withstand temperature extremes;** are free from freezing hazard; are easily ventilated for rapid cooling.
- ★ They can **stand idle indefinitely** without injury, without attention, and without expense.
- ★ They are **simple and easy to maintain.**

EDISON
Nickel • Iron • Alkaline
STORAGE BATTERIES

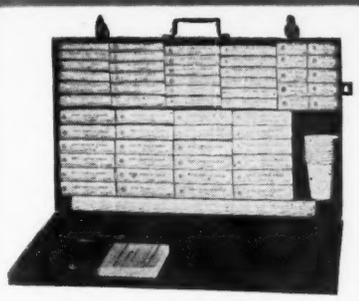


for

Better First Aid

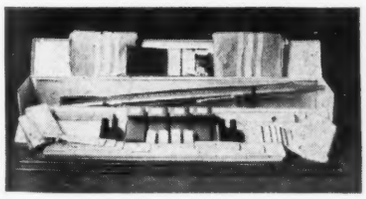
MSA

in and around the mine



M·S·A MINERS FIRST AID CABINET

This large and completely equipped cabinet contains a complete assortment of first aid materials and supplies suited to the requirements of the mine hospital or dressing station. The cabinet conforms in its contents to materials recommended by the United States Bureau of Mines for first aid treatment, and provides these in ample quantities. Designed for wall mounting, or transportation when required, the M.S.A. Miners First Aid Cabinet is an essential item of mine-safety equipment.



M·S·A CONTEST OUTFIT

for First Aid Training and Contests

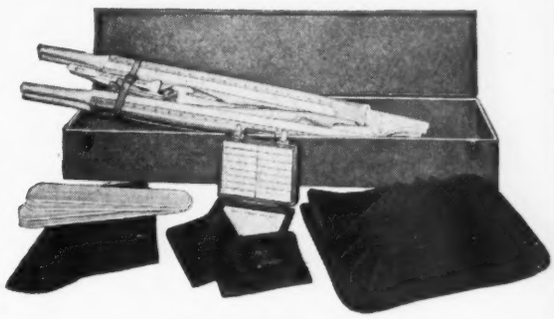
This outfit contains in a strong steel box the complete U.S. Bureau of Mines-recommended list of materials for first aid practice and contest work. The outfit simplifies transportation, aids in preventing loss or misuse of materials and aids the efficiency and appearance of the group. The Contest Outfit Box is of white-finished 24 gauge steel, with strong handles on either end. Further details on request.

M·S·A *All-Weather* FIRST AID KITS

Sturdy steel cases and complete assortments of unit-packaged first aid materials combine to make these portable kits ideal for exacting mining use. Each unit package contains one or more complete treatments for injuries, without waste. All liquids are hermetically sealed—all dressings are sterilized—the unit packages fit like blocks in the cases. The heavy-gauge steel case itself is dustproof and moistureproof, with a special replaceable rubber gasket sealing the edges when closed. Write for Bulletin FA-93.

M·S·A REDI-HEAT BLOCK

A unique, self-contained, safe emergency heat source for first aid applications—always ready for immediate use; produces top heat in 60 seconds—employs no liquids. The replaceable Redi-Heat Charge cylinder is unaffected by heat, moisture, weather or temperature and has unlimited storage life. Wrapped in cloth, block provides heat for approximately one hour per charge. Bulletin FA-92.



M·S·A FOLDING STRETCHER OUTFIT

A complete stretcher outfit contained in a durable steel case—suitable for easy transportation underground. The folding stretcher opens quickly to full-size army type, and has a selected dried ash frame, with all metal parts of malleable iron and cover of 12 oz. duck. Also included are a wool and a rubber blanket, four wood splints, two Redi-Heat Blocks, and a 16-unit M.S.A. All-Weather First Aid Kit. The Folding Stretcher Outfit case is finished in red crackle enamel with white lettering. Dimensions are 53" x 11⅝" x 8". Carrying handles at ends and brackets for mounting are standard. Bulletin FA-77.

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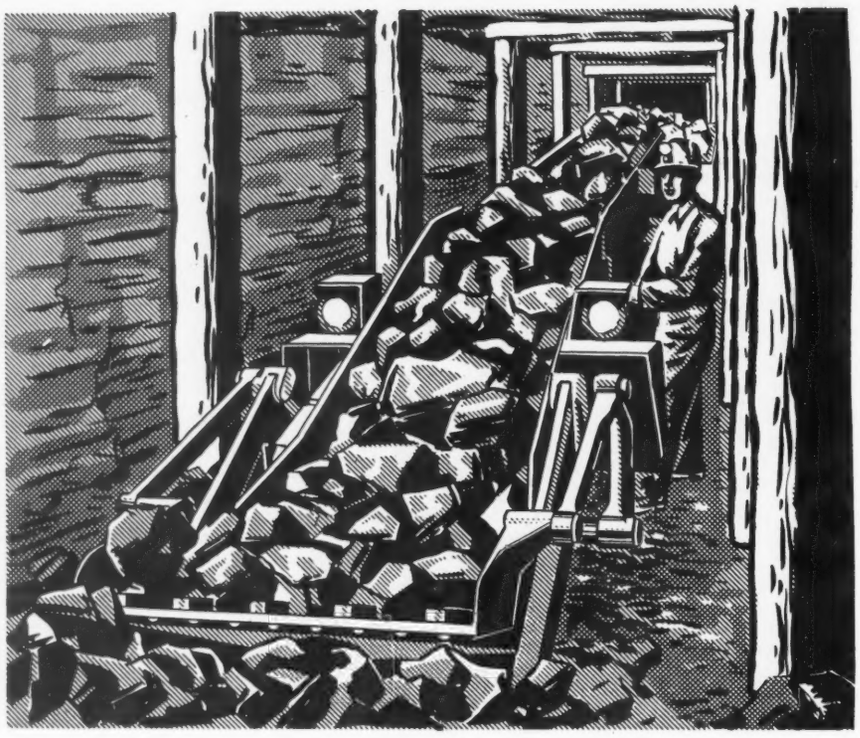

THE "AUTOMAT" MAKES FOR SAFE LOADING IN CLOSE PLACES

Safe loading in narrow places is something you can depend upon with the Whaley "Automat." There's no side kicking of rear conveyor to knock out timbers or injure men because the "Automat" loading head operates in a vertical lift shovel movement . . . all power being directed in a vertical plane, and consequently, there's no occasion for side kicking.

So, when you buy a loader, buy one that offers you safe loading along with maximum efficiency at minimum power costs. These advantages are all built in to the Whaley "Automat." And remember, the "Automat" will load, in its stride, any lump of coal that will pass through your tipple, or any lump of rock your cars, aerial tram or larries can take. Myers-Whaley Co., Knoxville 6, Tennessee.

Mechanical loaders Exclusively for Over 39 Years

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Maximum ease of handling is the key to the important problem of getting the most out of your mechanical loading equipment. The surest way to obtain maximum ease of handling is to use explosives that produce maximum tonnage of *properly-sized material—placed where you want it.*

Intensive research, quality control and modern manufacturing techniques stand behind all AMERICAN Explosives and blasting supplies. They're your warranty of complete dependability, safety, speed and all-round economy under all conditions. Whatever your requirement, there is a specific AMERICAN Permissible to meet it.

• *Capable field engineers are available at your call*

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Features that are important to successful coal mining . . .

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MINING EQUIPMENT

is time proved to lower costs
. increase tonnage . . . operate economically

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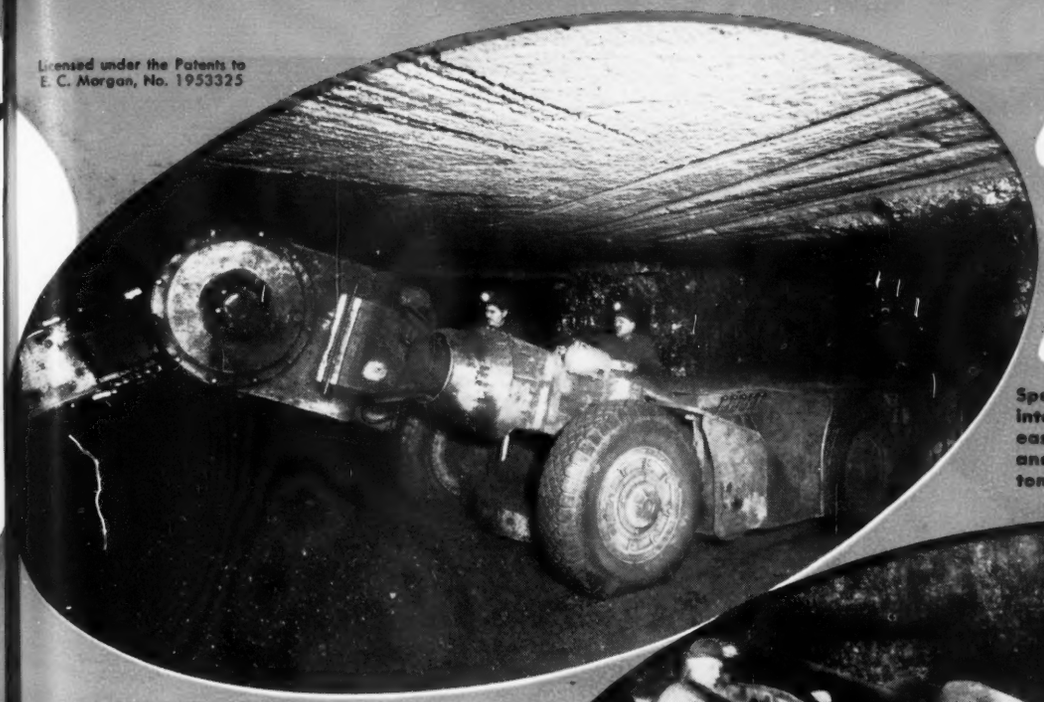

CUTS COAL FASTER

Speed, power and durability are built into every Sullivan Coal Cutter. Their ease of operation, maneuverability and fast cutting speeds mean more tonnage per shift.

LOADS COAL FASTER

Proved under a wide range of conditions, high seams and low, Joy Loaders move more tonnage per shift more quickly, reducing loading cost per ton to lowest possible figures.

MOVES COAL AT LESS COST

Shuttle Car mining has shown startling cost reductions wherever seam conditions permit its use. Joy Shuttle Cars are *proved* to be rugged, with low maintenance features.

Consult a Joy Engineer for

"The World's Most Complete Line of Mining Equipment"

SURE-FIRE RESULTS WITH

When you're loading a shot with the top inches deep in mud and water, you need a detonator that can take it . . . that gives positive action every time.

Conditions of this kind call for Primacord. Flexible, waterproof, easy to handle, Primacord can be depended on to give sure-fire results no matter what the weather. Branch lines down the holes are in contact with every cartridge. When you shoot, each charge *goes* with peak explosive power. That means you get the kind of fragmentation that makes big equipment pay dividends.

Because it's insensitive to stray currents, Primacord is the logical detonator to use wherever high-voltage electrical equipment is on the job. There's a grade of Primacord to meet every stripping and blasting need. Write today for particulars.

P-75

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Devoted to the Operating, Technical and Business Problems of the Coal-Mining Industry

Coal Age

SEPTEMBER, 1947

IVAN A. GIVEN, EDITOR

Better Than Fair

THE QUESTION of what's ahead for coal mining this winter, next year and the more-distant future was sharpened by certain developments in early September. One was reports of a sudden decrease—perhaps temporary—in overseas exports. Foreign countries, it was stated, were running out of dollars with which to buy in the United States. In addition, ODT officials were suggesting an embargo on exports because of the car shortage. Whatever the cause, the result was a number of private comments to the effect that if the export cut continued for any length of time, it might bring about a change to a buyer's market immediately rather that at some future time. On the other hand, the industry was wrestling with the problem of filling orders in the face of the aforesaid car shortage, while at least one oil company was taking large newspaper space to declare that all fuels, including coal, would be in tight supply this winter.

If the drop in exports was severe and continued for some time, it could have an effect on the coal industry much greater in proportion than the tonnage involved, especially if there was a parallel drop in the export of things involving coal in manufacturing and processing. But some additions to stockpiles should be in order and there is reason to feel that an appreciable drop in industrial activity is unlikely in the next several months. So, if cars are available and there is no work stoppage, a bituminous production of around 600,000,000 tons still is very possible in 1947 and output should continue high in 1948.

The long-pull picture looks good also. Population increases, rising industrial and business activity, the possibility of competing more directly with oil and gas fuels in a relatively short time and other favorable developments are fundamental factors making that picture the best in many years. Some producing areas are finding the outlook particularly favorable. The Far West is an example. With the competitive-fuel pinch on the Pacific Coast already growing tighter and with the prospect that the population of the Far-Western states will reach 22,000,000 by 1975, requiring some 90,000,000 tons of coal annually in addition to other fuels, Western operators should find users more receptive than in many years to sound merchandising backed up by an ample supply of low-cost coal—or other fuels made from coal—distances notwithstanding. While they may not be of the same order, the prospects for other producing areas also stand out well for the reasons previously listed. Anthracite producers, for example, point to a population increase of 3,000,000 in the anthracite-burning areas as a good omen.

While a buyer's market, with all it connotes, is something coal should be prepared for, the industry is favored when it comes to coping with it by several fundamentally better factors. So, if and when a buyer's market comes, whether sooner or later, producers should find help along time-tried and tested lines: low cost, good preparation, more-intensive research in coal usage, development of new products and improved merchandising.

Power for Profit

THE FACT that electrical, mechanical and hydraulic power is the cheapest of all methods of getting work done is something more than merely a philosophical consideration in coal mining. To the operating man, power is a potent weapon in achieving lower cost. To the worker, it is the way to more of the comforts and necessities that flow out of higher productivity.

Coal now is well into the big job of making loading a power operation. Consequently, it is in position to explore the possibilities in other and so far largely untried directions. Power timber setting is an example. Power moving of equipment in trackless mining, discussed elsewhere in this issue, is another. Still others can be discovered wherever men actually do work with their hands instead of operating the controls of a machine. Because extension of power to additional mining operations pays off, it should be a major goal in the management man's thinking.

Hamilton Wright Photo

HIGH-SCHOOL BOYS learn coal mining underground and in the classroom. Experienced mining men are teachers.

Training: Key to

Training Programs Draw Young Men Into the Coal-Mining Industry, Upgrade Skills of Workers and Build Backlog of Future Operating Officials—Many Approaches Used—Results Promise Brighter Future

By W. A. STANBURY JR.
Assistant Editor, Coal Age

"IT DOESN'T MAKE SENSE to turn untrained men loose on a $20,000 piece of machinery." This recent statement by a coal-operating official reflects a growing emphasis by coal-mine management on training men for better coal mining. Experience in the last ten years has taught company officials that more machines alone cannot boost the industry over its cost hurdles. It takes machines, of course, but it also takes men who can and will work machines at full capacity and thus close the gap between machine potential and machine performance. To get men like these, forward-looking coal operators are placing their bets on training—the development of brainpower to match growing horse-power in the mines.

What lines are they following? What are the ingredients of a training plan? How far should it go? How long should it last? Whom should it be aimed at? What are the tools? Best answer to these questions is to take a look at what already is being done to train men for better mining.

One of the star performers in training is the Hanna Coal Co., St. Clairsville, Ohio. Schooling there is aimed in three directions: at foremen, at miners who want to become foremen and at high-school boys, who are the miners of the future. Closely integrated, the plan can be outlined as follows:

1. **High School Course**—In the Smithfield High School, near the company's Piney Fork mine, Paul M. Skinner, principal, and Clyde R. Sutherland, instructor, with the help of Hanna officials, have set up a comprehensive coal-mining course to prepare youngsters for safe, efficient work in the mines. Germ of the plan came from the Mapletown High School, Greene county, Pa., which Mr. Skinner, Mr. Sutherland and Hanna officials visited to watch a similar project at work. Adding their own ideas to what they learned at Mapletown, these men built a model coal-mining course at Smithfield that trained 12 youngsters in 1945-46, 32 in 1946-47 and probably will enroll 100 in 1947-48.

Since much of the Smithfield course was new, a great deal depended upon the ingenuity and resourcefulness of the men behind it. Mr. Sutherland, who had worked "under the hill" some 15 years earlier and had since become a physics and chemistry instructor, gathered up-to-date practical ex-

Johnstown Democrat

MINERS AND FOREMEN get a math lesson at St. Francis college, where they become college men for six summer weeks.

Better Coal Mining

perience by spending his weekday afternoons and his Saturdays underground, watching skilled men, modern machines and new methods at work. In addition, through contact with equipment and machinery manufacturers, he collected a large library of handbooks, manuals and illustrative materials. Finally, he spent long hours questioning Hanna officials and operating men on practical problems and getting their viewpoint on operating methods and human relations. The result is a comprehensive up-to-date and realistic course in coal mining adapted to operating conditions in the Hanna mines.

In the first year of the course, the boys study maps, blueprint reading and mechanical drawing, all of these being oriented to coal mining. In the junior and senior years, they turn to geology, drainage, ventilation, trackage and transportation, drilling, explosives and blasting, electricity, mining law, etc. Physics and mathematics necessarily are included in subjects like these and thus the students get a new practical slant.

When each unit of the course is completed—drainage, for example—the class breaks up into groups of four to spend a day underground, where they see at work the principles and methods they learned in the classroom. A foreman or some other official goes along with each group of four, assuring each boy of individual attention from a man who knows mining. The classes immediately following underground trips are reported to be the most lively of the course, because students are eager to talk about what they saw and did in the mine. In a year's time, about 10 underground trips are scheduled for these boys.

Integrated Schooling

Coal mining also is integrated into social-science subjects at Smithfield by discussion of labor relations and basic economics, and into English classes by written work discussing the underground tours. Total time devoted to mining, therefore, is much more than the formal hour-a-day period.

School and company maintain a close liaison. School men declare that the course would fail without the support of the company, which supplies anemometers, barometers, lamps, etc., for classroom work, opens its mines for periodic visits and enables the instructor to attend such meetings as the Coal Convention of the American Mining Congress in Cleveland last May.

Immediate results of the Smithfield program are seen in the fact than within a week after school was out in June, 1947, four of the 32 mining-class graduates already had gone to work at the Piney Fork mine. The long view is even more promising. About 90 percent of the enrollees in sophomore, junior and senior classes in 1946-47 were sons of coal miners. This means not only that miners' sons are developing an appreciation of their fathers' jobs but also that their fathers and older brothers are learning some things from the high-school boys. In addition, the school itself has become an information center for Piney Fork miners and supervisors, who often drop in seeking answers to their questions.

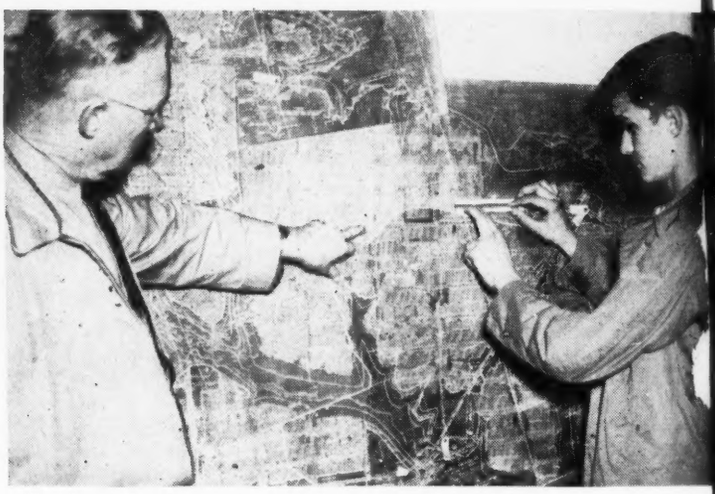
Company backing like that at Smithfield also sparks other high

Hamilton Wright Photo

TIMBER SETTING requires skill and judgment. These boys will make safe miners.

Wide World

CUTTING-MACHINE maintenance is taught in the Rostraver Township coal-mining shop in Pennsylvania.



MINE MAPPING is important for future engineers. A student looks over Hanna Coal Co.'s Piney Fork map.

school mining courses already established at Mt. Pleasant and Dillonvale, which are close to other Hanna properties, and has been promised for a fourth high school at Adena in 1947-48.

2. Training for Foremen, Weekly Two-Hour Meetings—Each week at the Hanna mines, foremen on the day shift meet with their superintendents to discuss their problems. No holds are barred at these meetings and discussions usually are brisk. Getting the answers to individual operating problems offers many opportunities for schooling in practical mathematics, physics, chemistry, engineering and industrial citizenship. Since the three shifts at Hanna rotate each week, every foreman attends one of these meetings every third week.

Night Classes—From September to May, night classes for supervisors meet twice a week and run from 8 to 10 o'clock or later. Principal subjects are math for engineering and English and public speaking for better reports, better job instruction and better conference leadership. One interesting aspect of these meetings is that a few foremen from nearby mines of other companies attend regularly. Hanna officials accept this as a tribute to the merits of the course and as a fulfillment of part of the company's responsibility to the industry at large.

Summer Course—An intensive two-weeks' summer course, meeting six days a week from 8:30 a. m. to 4 p. m., enrolls six successive groups of 15 to 18 foremen between June and early September. Men for this course are selected from those who attend the winter night classes, which are designed to uncover interest and aptitude and give foremen a good start for the intensive summer course. The Hanna Coal Co. employs Messrs. Skinner and Sutherland as instructors for these classes, which meet in the St. Clairsville High School building. Mining math, public speaking, English and general mining problems make up the syllabus. While they are going to school, foremen are paid their regular salaries and no charge is made against their vacation time.

3. Training for Miners, Foreman Preparatory Courses—From about Jan. 1 to the middle of June, when state foremen's examinations are given in Ohio, the Hanna Coal Co. offers a preparatory course for tripriders, motormen, shotfirers, non-certified supervisors and others who expect or want to become foremen. At each mine, the safety engineer is the instructor. Classes meet Sunday afternoons in the mine-conference room. Although attendance is voluntary, out of 22 enrolled at Piney Fork, for example, an average of 18 attended regularly last winter and spring. Tests, based on state examinations, are given at

TRACKLAYING in a simulated entry in Mercer County, West Virginia. Track was sent in by a nearby operator.

WELDING IS TAUGHT in McDowell County, West Virginia. These wheels were sent in for repair by a nearby mine.

LABOR-RELATIONS training. Here, a high-school boy, Piney Fork superintendent for a day, hears a grievance.

TOP MANAGEMENT SHARES in training at Hanna. Here, James Hyslop and Frank Zachar, Willow Grove "super," talk with students.

each meeting and grades are recorded. Fifty-eight out of a total of 59 students in these classes at Piney Fork have been certified. From these men, Hanna drafts its foremen. An unexpected development from this course has been a new understanding between the safety engineer and foremen, growing out of the new foreman's knowledge of the safety engineer's problems.

Safety Sessions—Once a week, each foreman conducts a 15-minute safety session with his men. Minutes of each meeting are written in triplicate and routed to the safety engineer and superintendent of the mine, and to the company safety director. The effectiveness of these meetings, which have turned up many first-rate safety suggestions, has been improved by foremen training in English, public speaking and conference leadership.

This, then, is the training program of the Hanna Coal Co.—an integrated, continuous, long-range plan that capitalizes on the company's own resources of personnel and equipment and, by adding to the resources of the local high schools, enables them to serve their communities better.

Elsewhere also, in Pennsylvania, West Virginia and Kentucky, coal operators and associations are backing high-school training programs designed to attract youngsters to the coal industry, acquaint them with its methods and machines, and make them safe, efficient workers. In various stages of development, courses in coal mining are open to boys at the Mapletown High School, Greene county; Rostraver High School, Fayette county; and Blakely High School, Lackawanna county, Pennsylvania; vocational high schools in Mercer, McDowell and Wyoming counties, West Virginia; Belfry High School, Pike county, and Prestonsburg High School, Floyd county, Kentucky.

Although the details vary from place to place, the basic pattern for high-school courses such as these is pretty well standardized. Courses generally are designed for three years and school time is divided between traditional academic subjects and vocational subjects, with careful correlation to insure that boys will become good citizens as well as good miners. A typical three-year course is made up as follows:

Sophomore Year, Mining Subjects—Geology of coal, mine law, mine gases, ventilation, timbering.

Shop Work — Welding, bench work, lathe, drill, shaper.

Junior Year, Mining Subjects—Tracks and transportation, ventilation, drainage, pumps and pumping, related mathematics.

Shop Work—Electrical circuits and diagrams, motors and controls. resistances, testing equipment.

Senior Year, Mining Subjects—Explosives and blasting, ventilation, mine law, mapping and drawing, mine chemistry, applied trigonometry.

Shop Work—Hydraulics, general

NEW FOREMEN learn their jobs by department rotation at The Hudson Coal Co. Back row, center, is J. D. Cooner, safety engineer.

HANNA FOREMEN in the summer course at St. Clairsville. At the window is Clyde R. Sutherland, instructor; right, Paul M. Skinner, principal.

mechanics (clutch, transmission, gears, power), timbering, tracklaying.

All Three Years—Academic subjects: English, social studies, physical education.

Teachers for mining courses like these are, for the most part, experienced mining men. For example, Michael Sapko, shop instructor at Rostraver High School, is a master mechanic and Clyde Balliet, classroom instructor, is a certified foreman. W. R. Raney, mining instructor at the Mercer County Vocational School, has been an engineer and superintendent in coal mines for 32 years. Realizing that teachers with practical mining experience are essential but scarce, coal operators and associations are cooperating with their local school boards and, in Kentucky, with the Mayo State Vocational School, to seek out qualified men for teaching jobs.

Moral and material support for these programs generally is provided by coal operators in the vicinity. Backing the set-up at Belfry, the Operators' Association of the Williamson Field (Kentucky side), levied a tonnage assessment; bought and remodeled an abandoned power plant to house the shop work, machines for which were provided by the state; and appointed a committee to work jointly with the Mayo school at Paintsville and the Pike County Board of Education in drawing up a curriculum and assigning responsibilities.

At the Rostraver High School, the Pittsburgh Coal Co. has given full moral support to the project, opened its nearby mines for conducted tours by mining students and sent some of its equipment to the school shop for repairs. Officials of the Duquesne Light Co. have talked to mining classes at the Mapletown High School about the coal industry and its opportunities and have led students on a tour of the company's neighboring mine. At Blakely High School, near Scranton, The Hudson Coal Co. keeps in close touch with the course, furnishes demonstration equipment for classrooms and conducts groups of students through its mines and its chemical laboratory.

In West Virginia, the Pocahontas Operators' Association, largely responsible for placing emphasis on mining in the vocational schools of Mercer and McDowell counties, has appointed an educational committee to advise and cooperate with local school boards. Operators of mines close by have sent in pumps, motors, shaker pans, car wheels, etc., for repair and maintenance at the McDowell County school and discarded track for practical demonstration in a simulated mine entry at the Mercer County school.

Opportunities Made Clear

Following through all the way, coal-company officials and operator associations are clarifying and publicizing the opportunities for young men in coal through newspaper stories, meetings with high-school youngsters and addresses before professional groups. Boys are found to study with more assurance when they learn that coal operations near such schools as Rostraver and Mapletown, for example, employ more than 4,000 men; that two collieries of The Hudson Coal Co. within a mile of the Blakely High School have a life expectancy of 25 years and offer jobs to more than 2,300 men; and that one company alone, near the Mapletown school, has at least 50 supervisory jobs paying up to $6,000 a year.

High-school and vocational courses like these grew out of disturbing problems that are common to nearly all regions where coal mining is the major industry: (1) skilled labor for mechanical mining was in short supply; (2) young men native to the area were taking up trades that took them away from their homes to other industries: (3) boys who stayed at home were dropping out of school before completing their education; and (4) the coal industry was not getting

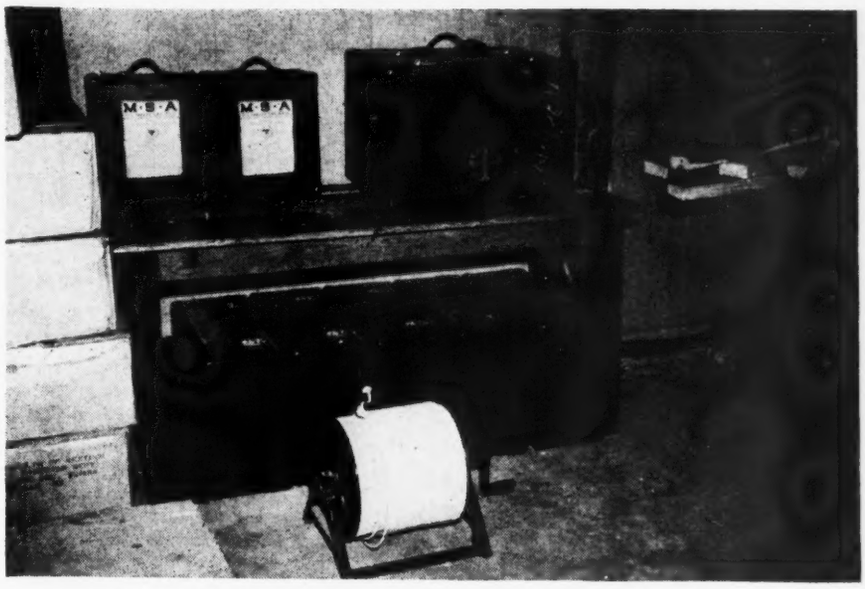
young men who were educated for a place in the industry whose taxes paid a large part of the public-education bill.

Those who have shared in these programs long enough to measure their gains are more hopeful of the future. The trend of miners' sons away from coal mining is being arrested. At the Blakely High School, for example, 18 boys out of a sophomore class of 45 elected the mining course. Thirteen of these 18 are sons of miners. That the youngsters learn a lot about practical mining is shown in the fact that seniors at the Mapletown school, who took the state foremen's examination just for practice, marked up better scores than experienced miners who were seeking certification.

MEN AT HANNA'S WILLOW GROVE mine get ready for foremen's exams. Joseph Matthews, right front, is instructor.

Boost for the Miner's Job

The availability of a coal-mining course in the local high school, besides dignifying and professionalizing the miner's job, has persuaded a good many boys to stay in school the full four years, thus providing the industry with better-trained beginners and the community with better-educated citizens. Finally, a backlog of skilled labor and a reservoir of future foremen is being built up. Since 1939, for example, 308 boys have been enrolled in the mining course at Mapletown. Figures for 1946-47 from other schools are equally encouraging: Rostraver, 39; Belfry, 37; Prestonsburg, 46. Most of the 12 graduates from the Mercer County school in 1947 already are working in nearby mines.



MINE-RESCUE CREWS are trained with this and other classroom equipment at Mayo State Vocational School, Paintsville, Ky.

Adult education, too, though not yet fully developed, is being planned in some of these schools for men already at work in the mines. The Mayo State Vocational School, in Kentucky, working with the Pike County Board of Education and the district operators' association, is mapping the Belfry High School curriculum so that it can be offered in small units to evening classes. In West Virginia, adult education already is on a firm footing, with 161 students, many of them miners and some of them ex-GIs, enrolled at the McDowell County school and a class of 70 veterans, all of whom are going through the mining course, at the Mercer County school.

Adult education for young men in some coal-mining areas takes the form of shorter familiarization courses, usually lasting for about 30 hours. In West Virginia, for example, nearly 100 men in classes at Beckley, Oak Hill and Bluefield recently completed a brief orientation course in mine-safety practices, first aid, explosives and mine equipment prior to seeking work in the mines.

In addition to high schools, colleges also are in the training picture. Several coal companies award scholarships to young men who show interest in and aptitude for mining. To mention only a few, the Pittsburgh Coal Co., Library, Pa., offers annually two scholarships in mining and electrical engineering and provides summer jobs for scholarship holders. In Kentucky, the management of the Inland Steel Co. mines, Wheelwright, gives three scholarships to youngsters in four nearby counties and the Princess Elkhorn Coal Co., Floyd County, invites high-school boys to compete for scholarships at Pikeville Junior College and the University of Kentucky. In Illinois, the Sahara Coal Co. has a scholarship plan for young engineers.

Although they do not offer scholarships, several companies offer summer work to college students in engineering. This year, the Eastern Coal Corp., Stone, Ky., is employing three student engineers for field work. Likewise, two mining-school undergraduates from the Pennsylvania State College School of Mines are working for The Hudson Coal Co. Programs like these give future coal men a practical slant on the industry, help them pay their way through college and give them an opportunity to appraise the opportunities in the company

and the industry. In addition, the company has a chance to appraise some of the young men who are entering the reservoir of potential operating officials.

In addition to schooling young men who hold mining or engineering scholarships, some colleges and state universities are taking the initiative in offering training to men already employed in the mines. For example, St. Francis College, Loretto, Pa., has just completed a six-weeks' summer session for mining men—the first part of what eventually will be a three-year course. Outlined in its broad aspects by a former president of the college, supported by the college's advisory board, which is manned in part by coal operators, and backed by an appropriation of $50,000 from the Central Pennsylvania Coal Operators' Association, the course in 1947 attracted 44 men, including several foremen, from places as far distant as 90 miles.

Largest representation from a single company, 12 men, came from the Rochester & Pittsburgh Coal Co., Indiana, Pa., and, all told, 15 companies were represented. Twenty of the men lived on the campus for the six weeks. The remainder commuted from their homes close by. Nearly all the students were subsidized by their companies and, by special arrangement, a few attended school by day and worked the night shift at their regular jobs.

College Course for Miners

Subjects at St. Francis College, taught by the regular staff, were economics, English, physics, mathematics, labor problems and the history and significance of the coal industry. Twelve lectures by outstanding coal men supplemented the classroom work and rounded out the dual purpose of the summer session—to provide background knowledge of our social, economic and political system and to provide men "with a workable and salable skill which will enable them to enter and hold positions in occupational fields with capacity for improvement and promotion."

Sole entrance requirement for the course at St. Francis College is a high-school education or its equivalent. At the end of the three-year course, the college will award a certificate which operators in the region have agreed to accept as a recommendation for promotion.

In Utah, another college-level training program, involving several neighboring coal-mine companies, is located in Carbon county, where extension courses of Carbon Junior College, a state institution, supplement the training resources of individual companies. The Independent Coal & Coke Co., Kenilworth, for example, with the help of extension courses from the college, starts a new 60-hour training project twice a year, in November and May, for miners who are preparing for inspectors' examinations. Subjects studied are mining methods, ventilation, explosives, mine layout and planning, electricity, mine law, first aid and mine rescue. Enrollment in the Kenilworth course numbers from 15 to 20 each time the course is opened.

Success in Utah

Success of the Kenilworth program is due to three factors: full company backing provided by George Jackson, superintendent, who erected a new building to house the classes and did some of the instruction himself; the able teaching of Sam Fratto, Kenilworth's safety engineer; and the quality of extension services from Carbon Junior College.

Similar classes under the general supervision of Irel Longhurst, director of vocational extension work at the college, have enrolled a total of 110 Utah miners employed in the Sunnyside mine of the Kaiser Co., the Castle Gate mine of the Utah Fuel Co., the Horse Canyon mine of the Geneva Coal Mining Co. and the Spring Canyon mine of the Spring Canyon Coal Co.

In Pennsylvania, the Mineral Industries' Extension Services, affiliated with the School of Mineral Industries, Pennsylvania State College, has long offered training in both the anthracite and bituminous fields. At present, three-year courses are offered. Classes are held twice a week for 30 weeks for a total of 150 hours annually. Subjects are as follows:

First year—English, including composition and writing; mining terms, geology of coal, Pennsylvania coal seams and fields, Pennsylvania coal history, mining mathematics, mining physics and chemistry, mine gases, ventilation and Pennsylvania mine law.

Second year—Coal-mine lighting, mine ventilation, mining mathematics, combustion and oxidation, mine fires, explosions, rock dusting, mine safety and accident prevention, mine surveying and mapping, explosives and blasting, mining electricity and mining laws.

Third year—Advanced mining math, mine ventilation, mining methods, including stripping; mine timbering, steam and compressed air (optional), mine drainage, mine haulage, preparation, Pennsylvania mine law.

Fourteen classes were held in the anthracite region last year with 16 instructors. Total enrollment was 308, with 139 completing the year's work. In the Pennsylvania bituminous region, 39 classes were held, with 1,268 enrolled and 705 completing the work. Pennsylvania also runs special classes. Last year, for example, seven special classes of 150 hours each were conducted in mechanized mining, with emphasis on maintenance and electricity. Two 100-hour classes were conducted in mine surveying and one, of 150 hours, was devoted to coal preparation. Completions were as follows: mechanized mining, 150 men; surveying, 82; preparation, 16.

In West Virginia, nine instructors of the Mining Extension Department of the state university conduct afternoon and evening classes in their respective districts and join together in the summer to offer a concentrated six-weeks "short course" in three or four principal coal-mining centers. Aim of the work is to train men for better jobs in the coal industry, prepare them for state foremen's examinations and refresh foremen and superintendents and keep them abreast of new developments.

Fitted to Local Needs

Afternoon and evening classes are organized by the district instructors after inquiries among operators and men about local needs. All the state asks is that a meeting place be provided. The three-year course meets for two hours weekly for 36 weeks a year, at the end of which time a certificate of completion is awarded. Subjects of study are as follows:

First year—Gases, safety lamps, ventilation, fires and explosions.

Second year—Mining methods, haulage, drainage, explosives.

Third year—Foremanship, plus any one of the following: mathematics, coal preparation, electricity, waste elimination, etc.

West Virginia's summer short courses, given in 1947 in Morgantown, Beckley, Logan and Montgomery, are a telescoped version of the three-year course, so arranged

that in 36 days, five hours a day, students get the equivalent of about two years of the evening course. Some men attend the summer session at their own expense and others are paid by their companies.

Since their beginning in 1913, these summer short courses and evening classes have sent a steady stream of better-trained men into West Virginia's coal mines, with the result that a large number of former students now are coal-company executives. In the 10-year period 1938-1947, a total of 13,870 men were enrolled in evening classes and 1,131 in the summer short courses. Hand-in-hand with the growth of these classes, the safety record in West Virginia mines has improved.

State Aids in Kentucky

In Kentucky, the state takes a hand in training through the Department of Mines and the Mayo State Vocational School. Five district men, paid by the state through the Mayo school, teach mining courses preparatory to foremen's examinations. Classes are organized as needed, usually at the request of operators in the district. The complete course runs for about three months, with classes meeting three times a week. The textbook for the course was prepared by the Kentucky Mining Institute. Out of about 1,500 men who took the course in 1946, some 375 were certified as foremen after taking the state examinations.

In addition, 10 men employed in the Kentucky Department of Mines devote a large part of their time to safety training. One result of this emphasis on safety is a chain of seven fully equipped mine rescue stations, two in western and five in eastern Kentucky. Another result is a steady decline in the state's mine fatality rate, from 278,129 tons per fatality in 1930 to 613,022 in 1946. Manpower for these stations is trained by state instructors in such centers as Wheelwright, Pikeville and the Mayo school at Paintsville.

Independently of state universities and departments, colleges and high schools, many coal companies carry on their own training activities as an investment in the future and as a means of boosting the quality of men available for promotion-from-within. The Hudson Coal Co., for example, sends selected miners and laborers through a one-year mining course in the company's operations (*Coal Age*, April, 1941). Periodically, these men are assigned to a different supervisor—section boss, ventilation and safety experts, shop and breaker superintendents—where they learn the job of that department. At the end of the year's broad experiences, these men are ready to become supervisors themselves.

The Lehigh Valley Coal Co., Wilkes-Barre, Pa., sets aside special sections underground for men new to mining. Before starting a new group of men, the colliery superintendent selects a foreman and a licensed contract miner to work with them. Length of the training period for new workers varies from one to six weeks, depending on the aptitude of the individual, and wages are those of a miner's helper. To emphasize safety, the safety inspector spends a large part of his time with the new men. When the training period is finished—the average is about two weeks—the new men are "tagged" for special attention by foremen and safety supervisors.

How a Company Helps

Intra-company training at the Carswell, Maitland and Keystone mines of the Eastern Gas & Fuel Associates, Kimball, W. Va., is paying off in higher efficiency, improved safety and boosted morale among the workers, who know that promotions are made from within. The secret of the plan, according to M. L. Workman, general superintendent, lies in giving men an opportunity to help themselves. In keeping with this policy, employees are encouraged to take correspondence courses in engineering, electric shop, mining, etc. Out of about 2,000 men, nearly 100 workers—mechanics, section foremen, machine operators, loaders, rodmen, checkweighmen, firebosses, draftsmen, shuttle-car operators, etc. — are learning to do their jobs better through these courses. Enrollees themselves pay their fees. The company's share in the schooling is to spread the word about availability of the training and to assign "sponsors" to help the men when they run into problems.

Films also are used in Mr. Workman's program. Having learned by experience the approaches that enlist the attention and cooperation of miners, he shoots and edits many of the films himself, using company properties, personnel and procedures to add interest. Considerable use also is made of other industrial training films, selected from an index that he keeps on file.

Special weight is given to safety training in the program at Kimball. Employees at the Keystone mine, for example, were 100 percent trained in first aid in 1946 and the Carswell and Maitland mines had records almost as good. In addition, an expert rescue crew has been formed at each of the mines. All this, Mr. Workman declares, has been done by the men themselves, with a minimum of direct subsidy by the company.

Ingredients for Good Results

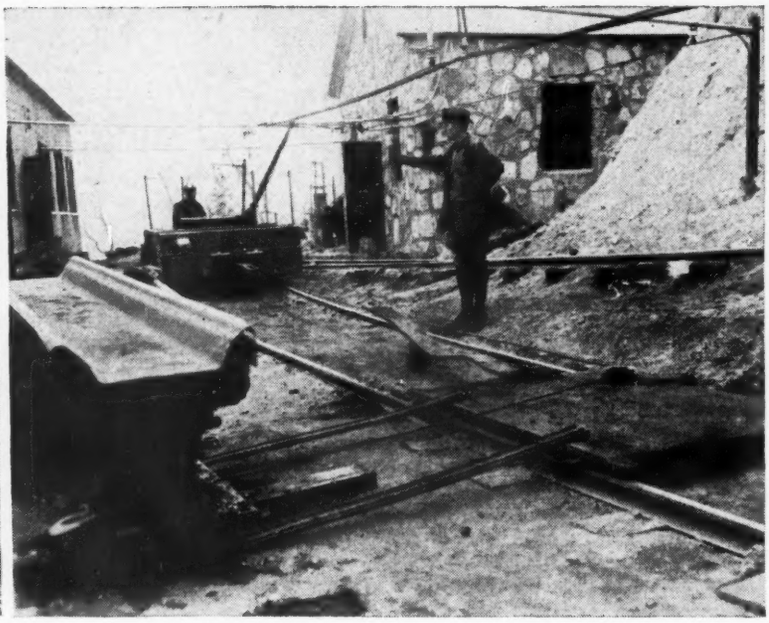
In ways like these, then—through their own efforts and through state, county and independent institutions—major segments of the coal industry are facing up to their problems of skill, morale and manpower and are finding at least part of their answers in training men for better coal mining. Although the plans differ in some respects, the basic principles of successful training, illustrated in the projects discussed above, are these:

1. Full backing and participation by top management.
2. Full exploitation of company resources—equipment, properties and manpower.
3. Full support for supplementary programs undertaken by outside agencies—high schools, vocational schools, colleges and universities, extension courses, state departments.
4. Clear statement of objectives and clarification of opportunities for promotion and reward.
5. Sights fixed not on production alone, but on equipping men to solve their problems, with assurance of the company's interest in their self-improvement.
6. Integrated planning that paves the way upward for boys who want to be miners, miners who want to be foremen, foremen who want to be superintendents and superintendents who want to go higher in the managerial ranks.
7. A point of view that appraises training as a continuous, long-term investment.

Companies that have been in the training business long enough to measure results count the following in the profit column:

1. Higher productivity.
2. Better morale.
3. More stable labor relations.
4. Improved public opinion of the industry.
5. Lower accident rates.
6. More intelligent industrial and community citizenship.

SLED FOR TRANSPORTING conveyor drives is but 3½ in. high. The runners are cut from locomotive tires.

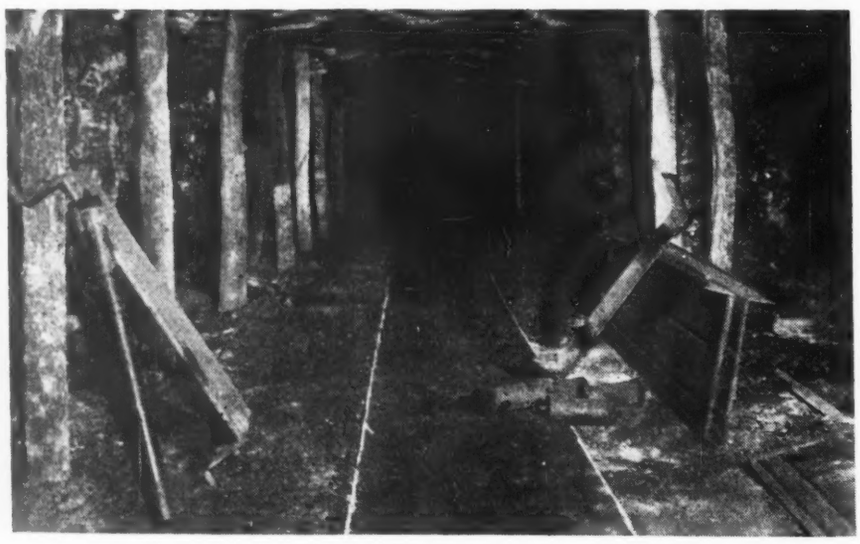


SPECIAL SNATCH BLOCK has been attached to the rail and the locomotive is pulling the shaker drive up the skid rails onto the sled.

Cutting Cost in Moving

Maximum Tonnage per Section First Step in Cutting Cost of Moving Trackless-Mining Units—Special Equipment and Methods Reduce Moving Time and Cost—Extra Units or Parts Curb Production Loss

By J. H. EDWARDS
Associate Editor, Coal Age

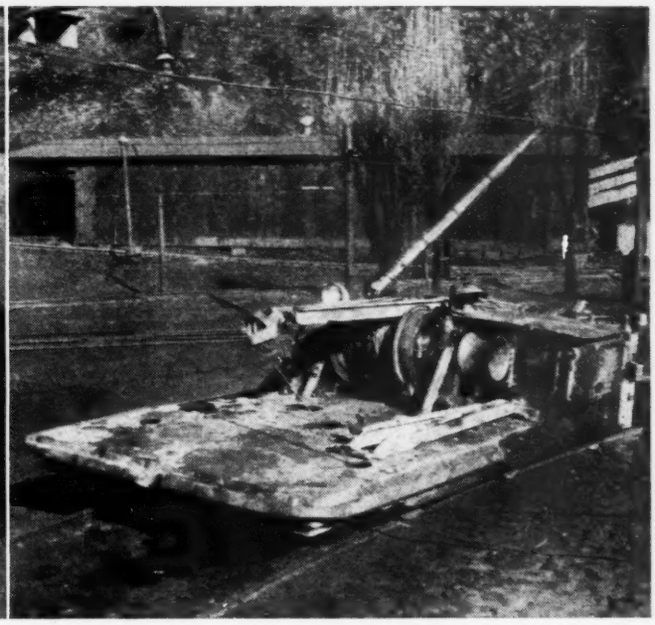


LOWER RUN OF 30-IN. BELT spliced ready for assembly of the intermediate sections. The belt was dragged in by a wire rope, snatch block and locomotive.

RECENT PRODUCTION and efficiency gains by many companies operating conveyor and trackless mines were made by adopting better ways of moving equipment. Few operators, however, are satisfied with their present methods. Keeping down the time machinery is out of production is the major reason why moving still is considered a real problem. Reducing the labor cost of making the move is second. Safety is always important and, while moving has not been responsible for many serious injuries, mechanized and standardized methods do reduce the chances of mashed fingers and toes and sprained backs.

Low coal poses a very difficult problem because men's efforts are hampered and roof or crossbar clearances may not be sufficient to permit transporting machinery on trucks or sleds with decks more than a few inches above the mine floor. Opinions as to what constitutes low coal are as varied and numerous as the mining districts of the country. However, when a man must keep his knees bent, as well as his back, to navigate, his efforts are greatly hampered. For most individuals, working heights below 44 in. come in that category. And when men cannot crawl with their knees straight down—which happens when the coal thins down

DEAD, OR DUMMY, pan line can be used to move pans to the face and also to carry cradles, timbers and other supplies.



SELF-PROPELLED HOIST-EQUIPPED moving car made from discarded arcwall-cutter parts. The boom can be raised by power.

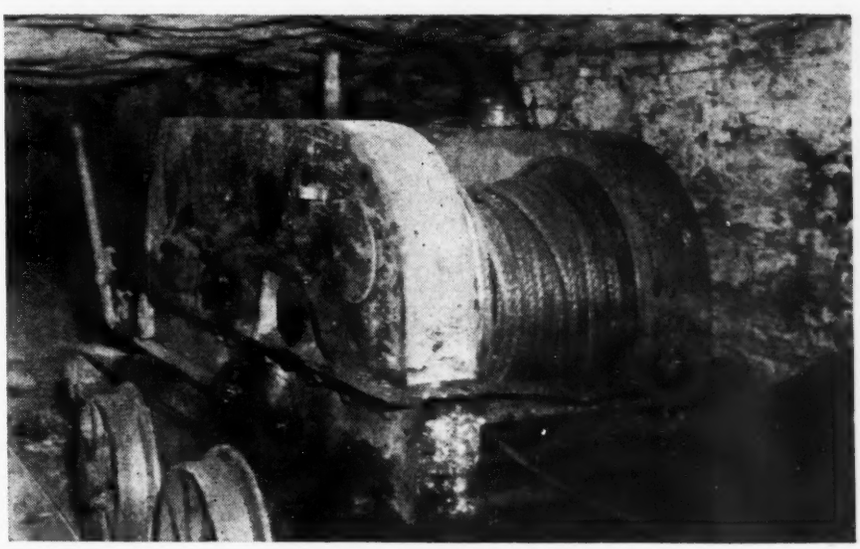
Trackless-Mining Units

to about 30 in. or less—things really slow down.

One fundamental step in keeping down the cost of moving equipment—especially conveyor equipment—is increasing the quantity of coal per territory. Ways include increasing the length of the belt, increasing the depth of the rooms, working rooms on both sides of the entry instead of only one and taking more or all of the pillars. How far any of these methods can be applied in any particular mine depends upon a thorough analysis of the conditions peculiar to that mine and the type of equipment employed. However, with the high wage rates prevailing today, moves are much more costly and anything that can be done in the direction of modifying the mining plan to reduce the number may result in a real saving.

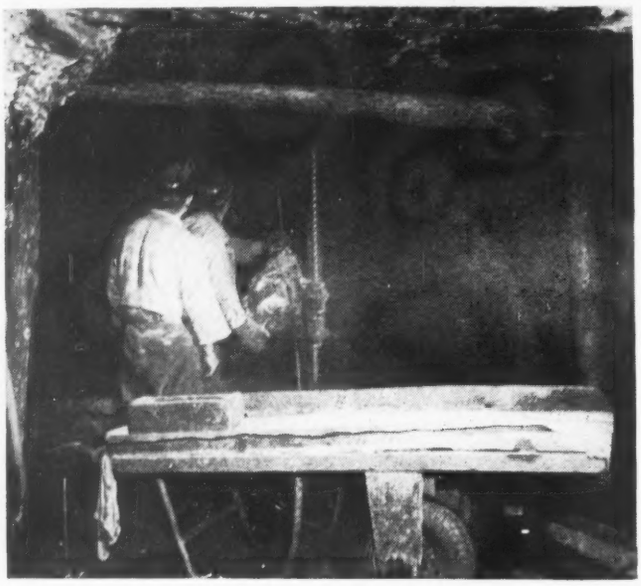
But while increasing the tonnage per set-up reduces the number of moves, a certain number still are necessary. The question then is getting them done as quickly as possible, which reduces the cost. As in many other mining operations, machinery is one of the answers. Increasing realization of the importance of special machinery and equipment for moving trackless-mining equipment and parts consequently has resulted in considerable development work at the mines themselves, as well as an increase in the number of special pulling and transporting outfits being offered by manufacturers, such as rubber-tired tractor-trailer units, crawler-mounted pullers, and crawler- or rubber-tired trucks. Many of these units, as well as other units developed at mines, double in brass as supply handlers, since moving supplies and moving equipment are closely related in many cases.

Thickness of the seam exerts a considerable influence on the type of mining equipment employed—and on moving methods and equipment. Typical methods and equipment are summarized in the following material according to types of mining equipment commonly employed in seams ranging from thin to thick. Since work is going on at many mines and new developments constantly are being announced, the summary that follows necessarily cannot be complete.

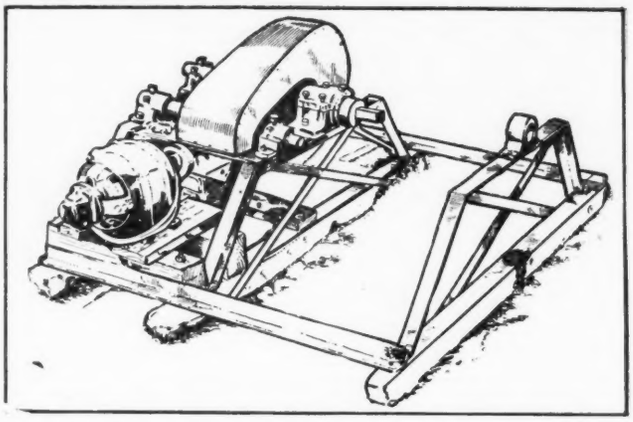


CRAB MOUNTED ON MINE TRUCKS and equipped with 650 ft. of 5/8-in. wire rope moves shaker drives and duckbills.

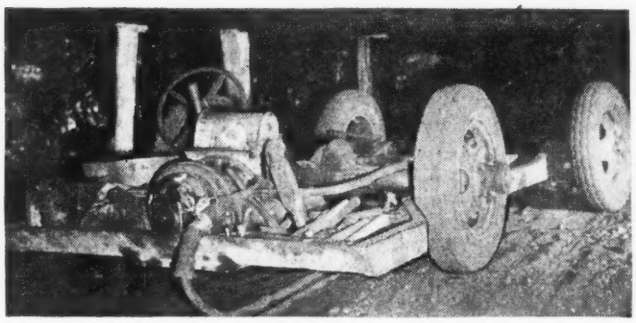
COST CUTTERS FOR TRACKLESS-MINING OPERATIONS



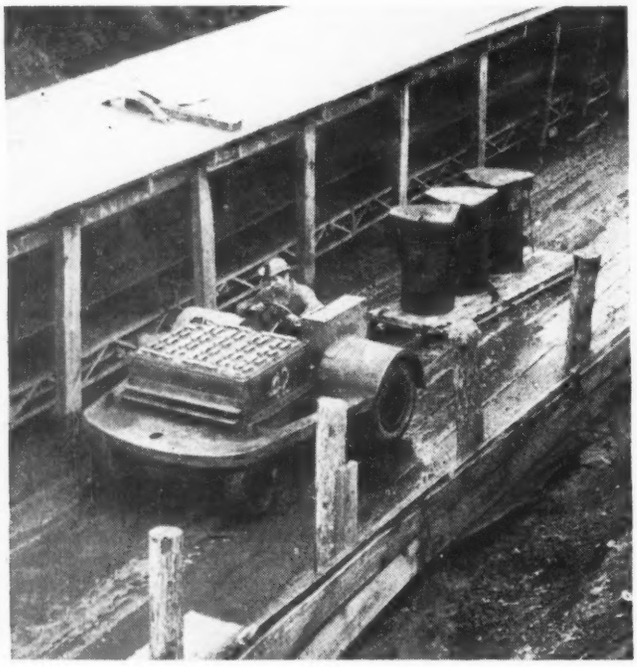
WHEEL-BARROW WHEELS are used on this driller's cart but the bed is elevated to convenient height by pedestals.



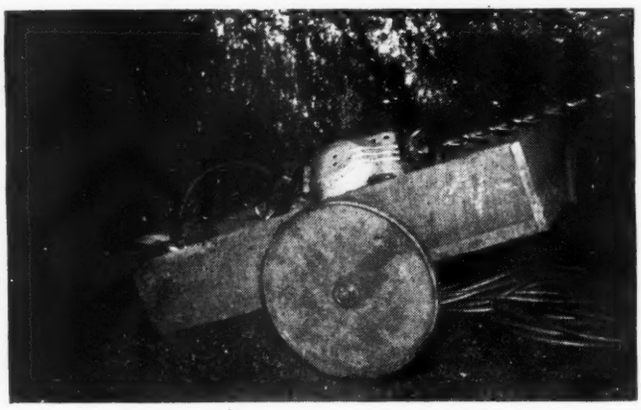
BELT WINDER saves hard labor in rolling belting and is used at times as a hoist for pulling pans.



SELF-PROPELLING rubber-tired truck for transporting shortwall cutters in a mine where tractor-trailers serve loaders.



BATTERY TRACTOR pulling a sled loaded with three transformers is about to enter a mine in 5-ft. coal.



LIGHT-WEIGHT DRILLER'S CART used in a 40-in. coal seam. The wheels are only 12 in. in diameter.

Moving room conveyors of the chain or shaker types discharging directly into, or over cross or elevated conveyors to mine cars.

In this group, 300 ft. is the usual limit of trackless transportation. The shortwall cutter usually stays in the one room and is economically pulled out by its own rope. With shaker conveyors, the pans commonly are moved to the advancing face by a dead, or dummy, pan line, which is dragged forward by the shortwall machine. This dead-pan-line method has the advantage that each pan can be loaded with the cradles, rollers and necessary supplies such as timber, cap boards, tamping material and rock dust for advancing one cut. That method was described in "Supplies Handling For Efficiency in Trackless Coal Mining," June, 1946, *Coal Age*. It is referred to here because, as previously noted, handling supplies and moving machinery are closely related.

The dead-pan line has its limitations, however. In some mines, the coal is so thin or rolls and horsebacks cut the height so much that all of the materials for a cut cannot be loaded onto the pan. In that case, a supply man may be necessary and he will have time to move the pans individually, using a light-weight push cart or a dolly running on the pan line. A shortage of pans may be another limitation on the use of the dead pan line.

With chain conveyors, most operators find it advisable to operate them reversed to carry supplies and conveyor equipment itself as the room is advanced and extensions are made.

Another problem in mines in this group is moving the shaker or chain drive to the next room. It can be

skidded along the track or loaded onto a special flat car mounted on low wheels or flanged runners consisting of arcs cut from discarded locomotive tires. Dragging the drive onto the deck of the car can be done with a mine locomotive but is accomplished more effectively with a small hoist on skids or mounted on one end of the flat car. The latter may be a self-propelling unit.

Conveyor drives set some distance from the track may be dragged to it or to the next room by the shortwall cutter. This use of the cutting machine as a hoist is quite common although maintenance men and the manufacturers of the machines complain that it is hard on them. A separate skid-mounted hoist for this duty is the solution arrived at by many. However, with lightweight conveyor drives, the use of the cutting machines as a hoist may be justified.

Installing a hoist on the same base with the conveyor drive to facilitate rapid moving has paid off in increased production per unit and per man-shift at several mines. At one mine in eastern Kentucky, where conveyor drives originally were fitted with demountable wheels and a propelling mechanism operated from the conveyor motor, skid mounting was later adopted and a hoist was permanently mounted on the unit.

Proper Hoists Required

Abuse of mining machines by using them as hoists results in part from a lack of knowledge of the tremendous pull that may be required to drag a conveyor drive along the mine bottom. Manufacturers of tractors designed for moving equipment have discovered that the drawbar pull required in some cases is 100 percent of the weight of the equipment to be moved. Certain crawler-type tractors designed with a weight of 5 tons for use in medium to high coal had to be weighted to 7 tons to increase tractive effort. Crawler tractors with a 1,000-lb. drawbar pull built for thin coal proved entirely too light in some mines.

The largest shaker drive weighs 5,000 lb. less motors and control. Adding 1,500 lb. for a permissible motor, its base and the permissible control brings the unit to 6,500 lb. Obviously, the dragging of a unit of such size over uneven or dirty bottom, and for a considerable distance, is beyond the capacity of a shortwall machine. A husky hoist or a crawler tractor of 7 tons weight is indicated for that job.

Where shaker or chain room conveyors discharging directly, or over cross or elevating conveyors, into mine cars receive coal from mobile loaders, the loaders, being self propelling, add no transportation problem. However, the use of duckbills on shakers introduces a complication. Old-style ducks can be pulled out of the room by the mining machine without much harm, but when it comes to pulling out the newer and heavier power ducks, some maintenance men argue that damage is bound to result. Here again, obviously, a skid-mounted or car-mounted hoist or special puller is the proper equipment for the job.

Moving section, or mother, belts up to 2,000 ft. or more in length serving shaker or chain room conveyors, either hand or mechanically loaded; belts discharging to mine cars.

In this type of mining—particularly where there is no supply track in the belt entry, moving the shortwall mining machine over the 1,500- to 2,500-ft. distance from a working place to the track to take it to the shop for a heavy repair job stands out as the most serious problem. Usually, temporary repairs can be made at the face to enable the machine to pull itself out but this long drag is slow and expensive and may do more harm to a machine already in bad condition. Obviously, if height permits, a crawler-type truck should be provided to carry disabled and replacement machines. One machine truck adds but a small percentage to the initial investment for a belt section. Bad top may, in some instances, require such close posting that a unit as wide as a crawler truck cannot be accommodated. In that case, a skid-mounted hoist or special puller is the alternative.

Belts also are commonly used in panels with rooms on both sides mined retreating, and where a supply track is installed in a heading paralleling the belt opening. Mines employing this general system usually are in coal not less than 48 in. thick.

In one such mine, operating in 6½-ft. Pittsburgh No. 8 coal in eastern Ohio, with rooms worked by duckbills which discharge to a mother belt, each section is equipped with a hoist mounted on a flatbed mine car. With 650 ft. of ⅝-in. wire rope, this hoist, operating from an anchorage at the outby room conveyor, serves for dragging the ducks and drives of the 10 shakers, five on each side of the panel. That same mine is equipped with 7-ton crawler-type tractors with cable and crab reels. These, for the most part, are used to drag bundles of plank-type crossbars recovered from rooms where they are used to hold the drawslate.

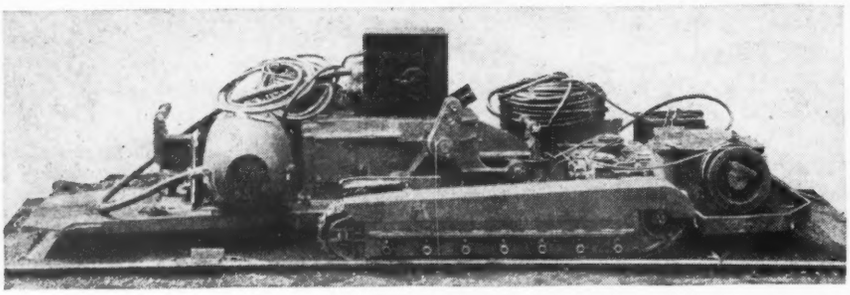
The years have brought many improvements and innovations in transporting, installing and removing section belts in mines in the class under discussion, where seam thicknesses range from 2½ ft. to 6 ft. or more. Weight of a belt head of the heavier type is 6,000 to 8,000 lb. Several manufacturers build them so they can be disassembled into three parts to reduce bulk and weight for moving. The main section will weigh around 3,000 lb.; the jib, or boom, section, perhaps 1,600 lb.; and the permissible motor (about 30 hp.), complete with base and controllers, about 3,000 lb. Some build them on skids and others not.

Belt Head Moved on Sled

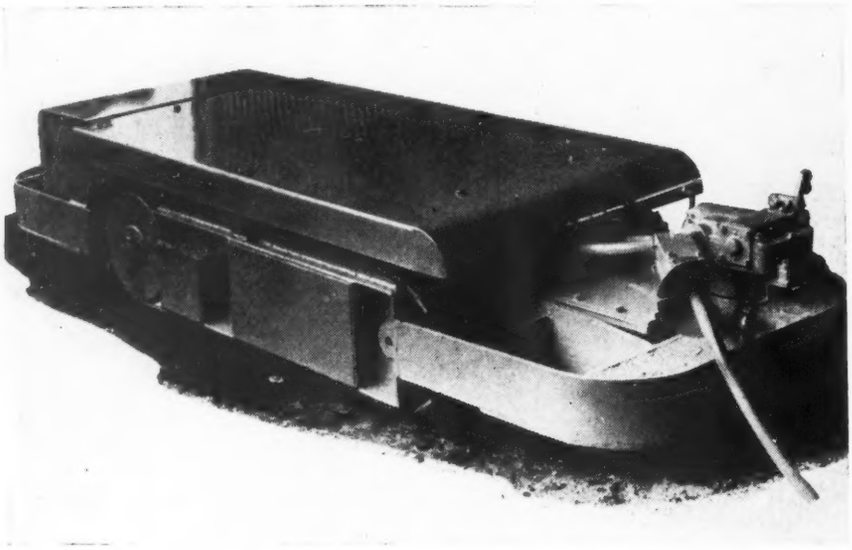
A simple and widely used method of moving the belt head, either as a unit or in sections, is to skid it onto a track sled which is pulled by a mine locomotive. As a rule, this sled consists simply of a flat plate to which is welded arcs cut from steel tires. Height of the plate above the top of the rail seldom is over 6 in. Other mines employ special flat cars mounted on flanged wheels. Because these are higher than sleds, the loading and unloading of the belt head is somewhat more difficult.

Section belts, in most cases, are installed by adding sections as the rooms are worked advancing on one side. Then, they are progressively shortened as the rooms are worked retreating on the other side. In other cases—for instance, where development for the belts is done with shuttle cars—the entire belt conveyor is installed in one operation and may be dismantled the same way.

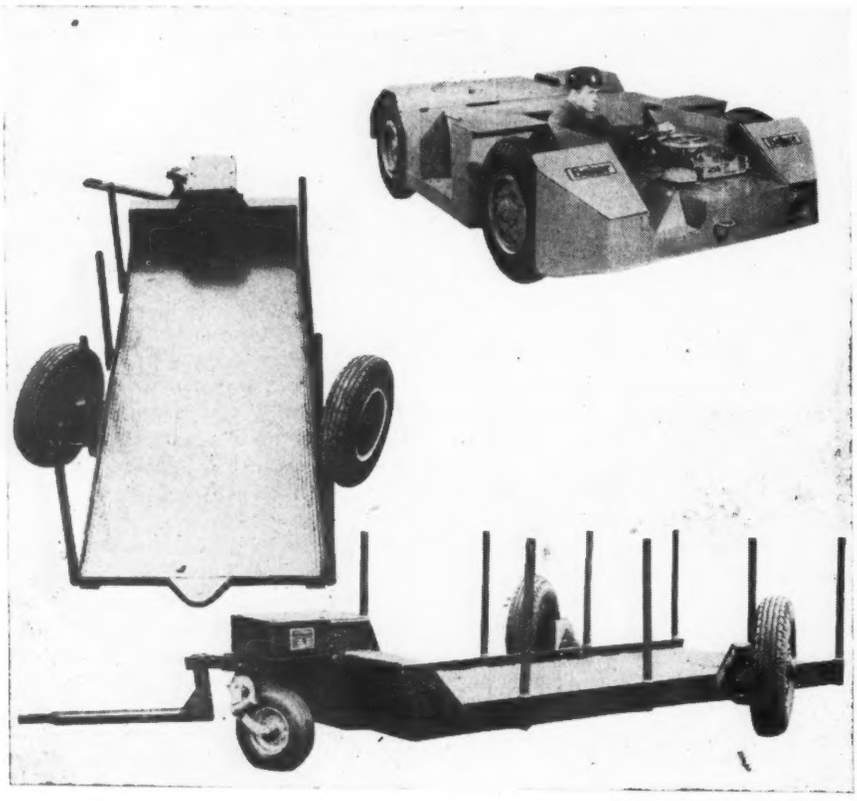
Lengths of the sections of belting influence the method used for transportation. Obviously, with one-step installation and dismantling, the belting can be in long sections—400 ft., for example. With multiple-step installation, the steps may be the same length—perhaps 150 or 300 ft.—in which case the



CRAWLER-MOUNTED TRUCK with crab winch for loading equipment shown here with shaker drive in place for transportation.



PULLERS of the type shown here are used in a number of mines for moving conveyer drives and parts.



LATE-TYPE TRACTOR and trailer for moving equipment and supplies in trackless-mining sections in coal mines.

belting itself will be those lengths. In many mines, however, the distance a belt is extended each time is not standardized. Some operators find flexibility an advantage and thus extend belt conveyors in lengths which suit the particular time and panel condition when the extension is made.

Pieces of belting up to 150 ft. in length commonly are rolled for moving. Sections of 200 ft. to 500 ft. usually are "ribboned" or "accordian-folded" into mine cars or onto special flat cars. Roof clearance largely governs the method of handling the belting and especially the size of roll. Power-driven belt winders are used in some mines to reduce laborious work. Reports from one mine (*Coal Age*, July, 1946, p. 85) tell of the belt winder also being used as a winch to drag belt-conveyor sections out after the belting has been removed.

Belt Installation

Installing an entire 1,500- to 1,600-ft. belt conveyor at one time is done conveniently by first stretching the entire lower run of belting on the mine floor and connecting the splices. Some drag the belting by hand and others handle it by snatch block and wire rope pulled by a mine locomotive or hoist, thus conforming to the trend toward eliminating more and more of the heavy manual labor. Intermediate sections are assembled in place for the lower run after the idler spools, troughing rollers, pans and brackets have been distributed along the entry. The upper run of belting usually is pulled by hand along the troughing rollers.

Standard practice in dismantling or shortening a section belt is to make use of the power head to pull out the extra belting, carry the intermediate sections and drag the tail piece. Assuming that a 1,500-ft. belt conveyor is to be shortened 50 to 100 ft., the usual steps are as follows:

1. Dismantle the intermediate section adjoining the tail section and load it onto the belt.
2. Switch on the power to move the belt a short distance, then dismantle and load the next and succeeding sections the same way.
3. After the component parts of the desired number of sections are conveyed to the belt head and unloaded, operate the belt until a splice comes around the head pulley.
4. Disconnect splice and anchor the lower run of the belt to the frame of the belt head.

5. Maintaining some lap over the head pulley, use power to drag down the tail section and close the gap left by dismantling the intermediate sections.

A trend toward buying extra drives for conveyors of the chain, shaker and belt types, and extra tail sections for belt and chain units, is paying off at a number of mines. Productions per section and per man-shift have been raised materially. With, for example, a mining plan with rooms worked advancing on one side and retreating on the other, the extra belt head, tail piece and a few intermediate sections, already taken out of the retreating section, are set up in the next panel ready for immediate use when another panel has finished. Under this system, standardization of equipment is important. In a mine operating 10 belt sections, all with belts of the same make, one extra drive and tail section will suffice. If the 10 units include three makes of belt conveyors, then the quantity of extra equipment will be trebled.

The trend toward having extra equipment has been paralleled by growing use of trained moving crews. In a mine outstanding for high production per man-shift with duckbills, a production crew completing a room at any time during a shift can start producing in new rooms in 5 to 10 minutes.

Moving equipment where rubber-tired haulage equipment, delivering to belts or to elevators discharging into mine cars, is employed.

At a considerable number of mines in this group, the transportation of production equipment is rapidly being solved by introduction of self-propelling mounted cutting machines and coal drills. Timbering machines now are considered production machines and these, too, are made self-propelling. Through limitations imposed by thin seams and, in some cases, by lack of capital, numerous mines will, of course, continue to use shortwall cutters and hand-held or post-mounted drills, both of which require some auxiliary means of transportation.

While the standard method of moving shortwalls in shuttle-car work is based on factory-built crawler-type trucks, some operations have made self-propelling underslung rubber-tired units for carrying these cutters in local shops, using parts of motor trucks or cars.

For the most part, operators find it economical to let the driller move his equipment on a push or pull cart. These carts range all the way from high ones on wooden buggy wheels, through other models on wheels and tires from Model A cars, to light-weight tiny carts on 12-in. disk wheels with rims but 1 in. wide.

Since these drill carts are moved by hand, it goes almost without saying that they should be of no heavier construction than is necessary to carry the load with reasonable maintenance. Small-diameter wheels make for light-weight design, but their use is limited by the character of the mine floor and the general housekeeping. In high coal, there is a preference for carts with beds at table or work-bench level. High carts that are no wider than the bed itself are made by using small wheels and high pedestals.

Spare Units Worthwhile

Some companies have made great strides in reducing production delays growing out of frequent moving of elevators in shuttle-car development work. On low wheels or skids, they are pulled along the track or on the mine bottom by a locomotive, spotting hoist or loading machine. By having advance tracks completed, except for gaps for shuttle-car roads, and by carrying other preparations as far as possible before the move, production delays may be cut to less than 2 hours. One company reports making 240-ft. moves regularly in 1½ to 2 hours.

Shuttle cars themselves are being pressed into services as tractors or pullers in mines using them. In one southern West Virginia mine, for example, the loading machines are moved in and out of the mine on a sled running on the mine bottom. The sled carrying the loader is pulled by *two* shuttle cars.

Another application of shuttle cars as tractors is in the moving of the shaker-type feeders which take coal from the shuttle cars and place it on the belt. Each feeder holds a shuttle-car load of coal. Seam thickness is 42 in. and the top is good. When the belt is extended, *two* shuttle cars pulling in tandem drag the shaker feeder, complete with drive, ahead, at the same time pulling forward the tail section of the belt conveyor, which is tied to the feeder.

There being many a.c. mines in each of the groups discussed in the foregoing, the moving of transformers enters the picture. Voltage delivered to a.c. motors must be maintained close to rating or the equipment stalls. Consequently, transformer substations must be moved frequently.

Many of the a.c. mines are in coal so thin that 12 to 18 in. of bottom or top must be taken to provide height for the lowest transformers available for the duty. Covers on cases of old transformers are not sufficiently tight to permit tipping without removing the liquid. As a result, they seldom are moved or installed in places where height has not been gained by taking top or bottom. A sled, dragged on the mine bottom or along the rails if a supply track is installed, is the usual method of transportation.

The newer types, including liquid-filled and air-cooled transformers, are better adapted to moving in thin seams because they can be tipped over onto a sled. The vent hole of the liquid-filled type must, of course, be plugged temporarily. Ordinary friction tape is used for this purpose in some mines.

Elevator Moves Speeded

Unfortunately, it is difficult to time the completion of a room or of a section so that the moving of equipment can be scheduled for an off-shift or a week end. When spare equipment is not available to be set up in advance of the actual move of the production crew, the interruption is likely to mount up to a full shift or more. As an example, dismantling the last 300 ft. of a section belt conveyor and installing it in the next room panel usually requires the work of 8 men for a shift. Some operators are fairly successful in timing the completion of a panel so that the move can be made on an off-shift or a week end. Since men do not like to work on Saturday nights, however, the Saturday day shift is selected for moving if the mine is not producing that day.

Mechanized moving equipment designed to eliminate laborious work is fast catching up with other improvements of recent years. However, efficient use of the best moving facilities calls for study and experimentation to find the mining plan best adapted to the conditions. It also calls for standardization of moving preparations, standardization of the moving sequence and adequate training of supervisors and workmen doing the moving.

SIX-INCH AND LARGER lumps predominate as coal is loaded out of the old stream bed at Mayview stripping.

Topsoil Reclaimed by Stripper

Rich Earth Washed from Nearby Hillsides by Frequent Floods Reclaimed at Rothey Bros. Stripping and Stored for Sale—Creek Bed Moved—Light Equipment Installed and Raft Pump Provided

SCALPING AND STORING 4 to 5 ft. of flood-borne topsoil and removing 15 to 20 ft. of additional overburden, Rothey Bros., Inc., produces 1,500 to 2,100 tons of low-ash bituminous coal daily at its Mayview stripping operation. The 79-acre tract is in a narrow valley one mile south of Bridgeville, Washington county, Pa., and 300 yd. east of State Highway 519. With 700,000 tons of coal estimated, two to two and a half years of activity is predicted. B. W. Rothey, president and supervisor, and Robert Rothey, vice president, have their offices in nearby Elizabeth, Pa.

For many years, one or two floods a year have raced through this small valley, leaving behind a deposit of rich alluvial soil from the hillsides of Washington and Greene counties. In time, this has built up to a deep, fertile layer. The Rothey organization expects to cash in on this natural deposit, thus salvaging a valuable resource that otherwise might be wasted in stripping, and canceling out a part of the cost of overburden removal by selling the topsoil at the prevailing market price.

Even now, topsoil is being sold at the site of the Mayview operation, though not by Rothey Bros. In exchange for the coal rights to the northwestern corner of the present property and permission to move the stream bed some 500 ft. to the east, Rothey Bros. agreed to store topsoil from the old creek banks along the northern third of the highwall, which lies within the bounds of the adjacent property owner. When this stock of topsoil is disposed of, Rothey Bros. will begin selling their own topsoil, part of which still is untouched by stripping and another part of which was stored for their own future sale alongside the new creek bed, which lies outside of the lines of the adjoining property. For the present, however, until their neighbor disposes of his stockpile, Rothey Bros. are casting topsoil into the spoil banks along with other overburden.

Flood Hazards Reduced

Floods that have enriched the valley land over the years also have made it unwise to move heavy equipment into the operation and have forced previous strippers to abandon efforts to get the coal out.

TOPSOIL STORED on the highwall along the old stream bed will be sold before the dragline makes the next pass.

Rothey Bros. have reduced this hazard by installing light, mobile equipment that can be moved out easily and quickly in case of flood and by building a raft that will float pumping equipment when the flow of water into the pit exceeds pumping capacity.

Dragline on the Highwall

A Marion 40-A dragline with a 4-cu. yd. bucket and an 80-ft. boom, powered by a Cummins diesel and mounted on crawlers, works from the highwall at the end of the cut, retreating as the cut advances. The dragline works two 10-hour shifts a day. An Oliver FD "Cletrac" bulldozer does the backfilling and leveling. During the second shift, one of the loading shovels often moves in to help with stripping. A small shovel can do the job because the highwall is never more than 20 to 25 ft. high.

Two loading shovels work in the pit one 10-hour shift a day—a Manitowoc 3500 with a 3-cu. yd. dipper and a Manitowoc 3000 "Speed Shovel" with a 2-cu. yd. dipper. The smaller shovel, brought in from another operation and now more than 3½ years old, advances southward in the pit. It has loaded as much as 1,780 tons in a single shift at the present site. The larger shovel, which moves northward in the cut, was delivered in June, 1947, to replace a 1½-yd. unit. Both are powered by Caterpillar diesels. Loading is done six days a week, railroad cars usually being available from the two-track Pennsylvania R.R. line adjacent and parallel to the pit.

Until recently, haulage was handled by an assortment of rear-dump trucks ranging in capacity from 5 to 15 cu. yd. under a contract with a local trucking concern. In June, however, three new 20-ton eight-wheeled International diesel tractor-semi-trailer units were delivered to the contractor and took over the haulage job. Transport from pit to tipple costs about 15c a ton for the three-quarter-mile average haul.

Bulldozer Builds Roads

The road itself, 20 ft. wide with a 3-in. shale base and a layer of top screenings, was built with Rothey Bros.' own bulldozer and is maintained by an Austin-Western 77-Sr. motor grader.

Because the coal lies beneath the level of the creek bed, drainage problems are serious even when rains are slight. Water must be pumped 24 hours a day over the highwall and across 300 to 400 ft. of bottom land to the temporary creek bed. In its temporary channel, 500 ft. to the east of its old bed, the creek is 18 ft. above the top of the coal.

Raft-Mounting Protects Pump

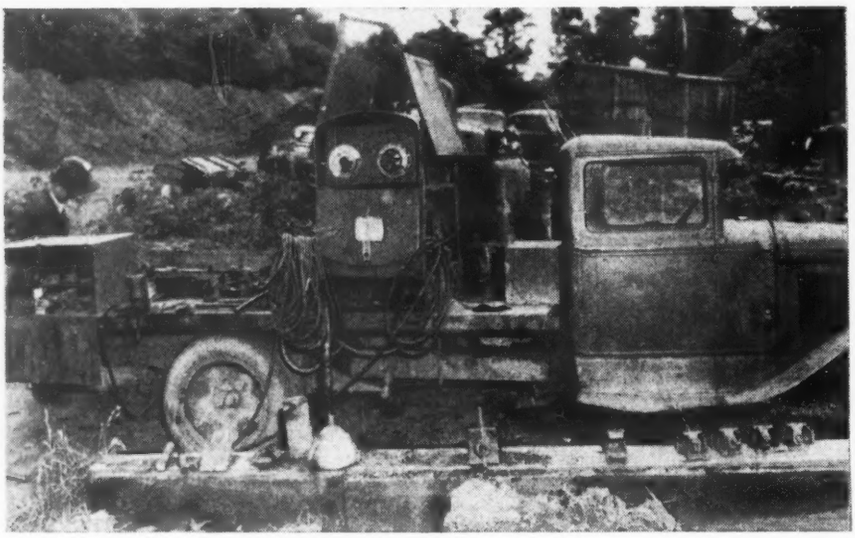
To keep the pit dry, a new 8x6-in. Fairbanks-Morse centrifugal pump, driven by a 75-hp. General Electric 440-volt motor, has been installed. The new pump has been mounted on a 7x14-ft. raft to protect it in case of a flash flood or in case water comes in while the pump is idle or broken down. A span of 3 ft. from the bottom of the raft to the pump platform provides protection against choppy water. Eight sealed oil drums attached by steel bands provide buoyancy for the raft and wire rope anchors it to the highwall.

Rated at 3,500 g.p.m., the new pump has replaced two 6-in., two 4-in. and one 2-in. pumps, all gasoline driven, which now are used

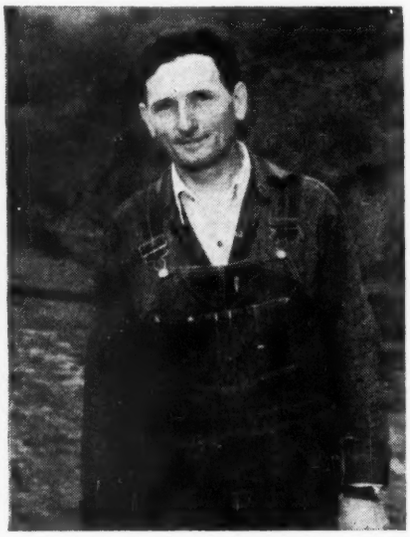
MEN AND EQUIPMENT AT THE MAYVIEW STRIPPING

DRAGLINE WORKS on highwall at end of cut, retreating as the cut advances. It is equipped with a 4-cu.yd. bucket and 80-ft. boom.

TWO PICKERS on the conveyor and one in the car ready the coal for market.



PORTABLE WELDING MACHINE provides on-the-spot service for light repair jobs, using either gas or electric equipment.



Robert Rothey, vice president, Rothey Bros., Inc., snapped on the job.

RAFT-MOUNTED PUMP will be safe in high water. Power cable is supported by wooden arm-and-column on the 7x14-ft. platform. The pump is an 8x6 unit driven by a 75-hp. motor. Oil drums provide the necessary buoyancy.

B. W. Rothey (left), president, Rothey Bros., Inc., with J. J. Seiler, division stripping superintendent, Pittsburgh Coal Co.

only for spot jobs and as standbys. A 1,000-ft. Anaconda cable brings electric power to the pump from a transmission line running alongside the Pennsylvania tracks. The cable is supported clear of the water by a column-and-arm structure built onto the raft.

On-the-spot welding jobs are done on a bed of a 1½-ton Ford truck specially equipped for this work. An 85-hp. Continental motor, mounted about 2 ft. behind the driver's cab, drives a 300-amp. Type SAE 300 Lincoln welding machine. Acetylene tanks are carried at the left between the cab and the generator. A storage bin for welding rods, a chest for tools, a vise and working space are provided on the truck bed.

No Blasting Needed

The Pittsburgh seam mined at the Mayview operation is 6 ft. thick. Just above the coal is a 2-ft. layer of drawslate, locally known as "bluestone." On top of this is a 3-ft. stratum of "rooster" coal, topped by 5 to 8 ft. of soft blue shale and 4 to 5 ft. of fertile topsoil. Neither coal nor overburden needs blasting.

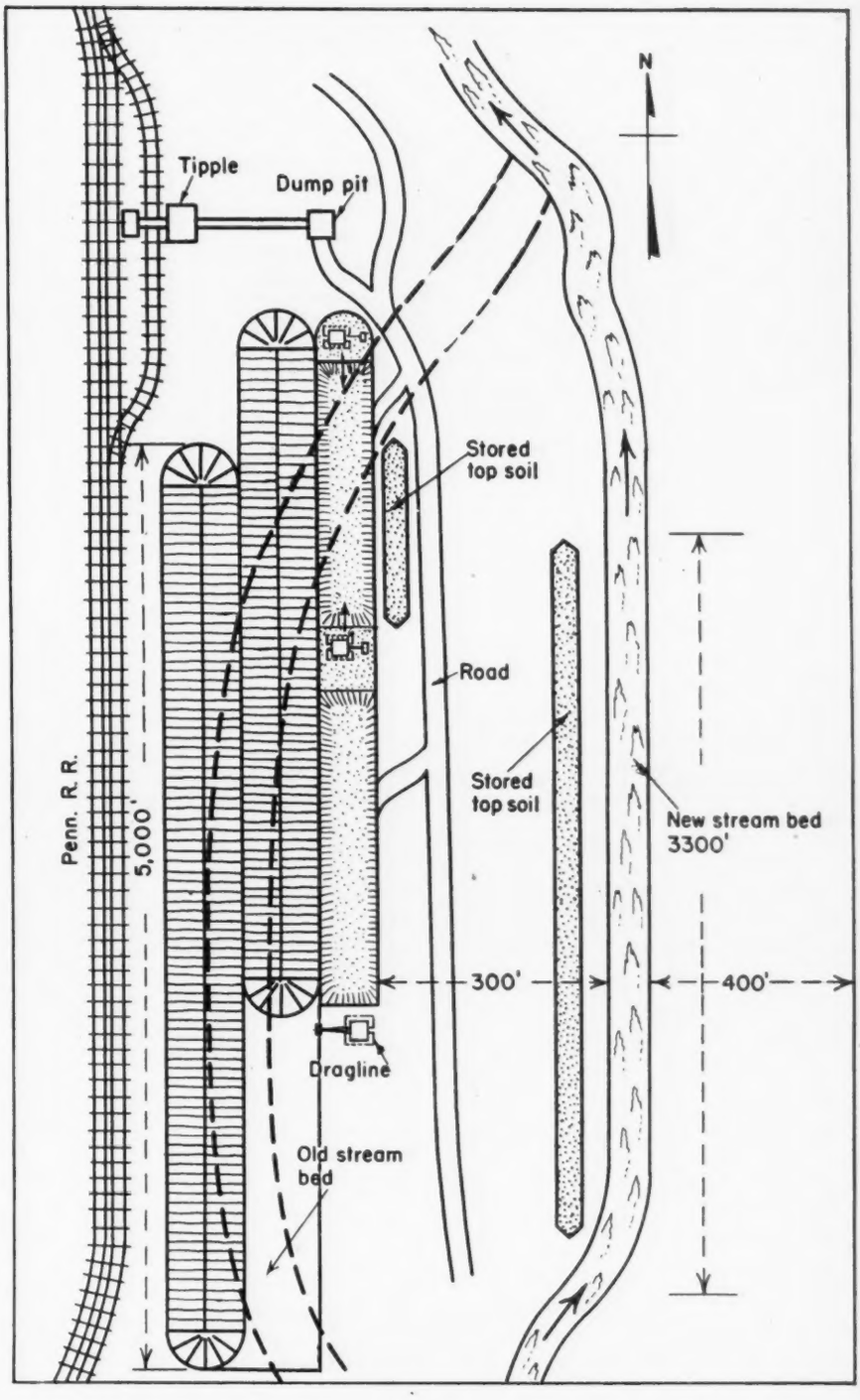
By far the greatest part of the coal comes out in large rectangular lumps over 6 in. in size. Though the fines are high in sulfur content, the lumps are so clean that no preparation is necessary beyond hand picking by three men—two along the conveyor belt from dump pit to tipple and one in the railroad car that is being loaded at the time. The bottom is hard, clean slate and the shovel rarely if ever pierces it, though crawler treads do cause it to flake slightly. Hand picking is simple, however, because the flaky slate is easily spotted as it moves along the conveyor. Ordinarily, only one man with a hand shovel is needed for clean-up behind the loading shovel.

First move in preparation for stripping was diversion of a creek, about 40 ft. wide, to a new channel 500 ft. to the east. The Marion 40-A dragline cut the new channel to a length of 3,300 ft. and piled the topsoil for storage along the west bank of the new bed. Once the creek was turned into its new bed at the southern, or upstream, end of the property and passed through the 3,300-ft. channel, it found its way through natural depressions to its old bed near the northern, or downstream, end of the operation.

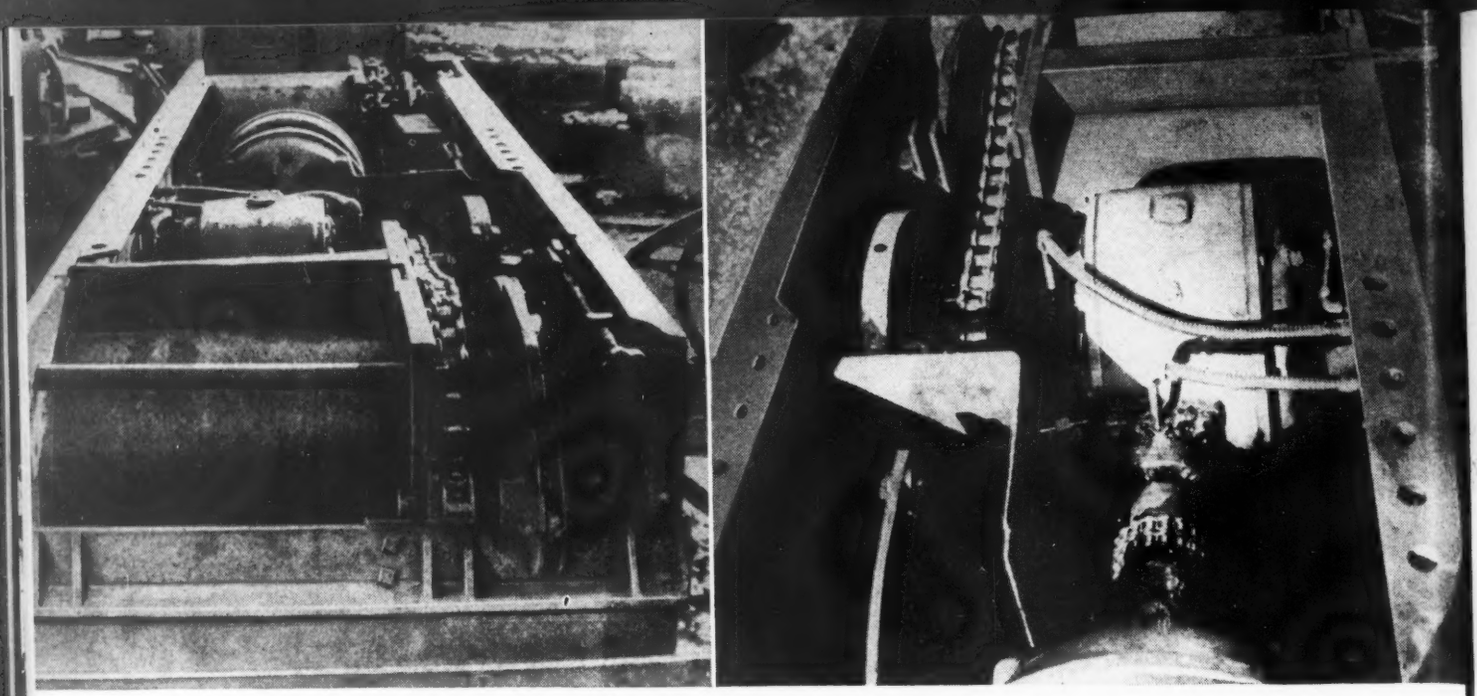
The first cut, about 5,000 ft. long and 80 ft. wide, was made in the old creek bed. In this part of the operation, topsoil from the northerly third of the cut was stored along the highwall to the west of the cut to be sold by the owner of the neighboring property, who then removed it to make way for the next cut. Succeeding cuts have been 80 ft. wide but length has been increased to 6,000 ft., which will be standard from now on.

After the fifth or sixth cut, the stream will be turned back to its original bed. Rothey Bros. have agreed with state authorities to provide a 120-ft. channel that will contain the creek when water is high.

At the tipple, which is operated by the Pittsburgh Coal Co. under a joint agreement with Rothey Bros., the coal passes over a 1¾-in. bar shaker and is loaded through twin booms into railroad cars, which are shunted onto a loop paralleling the Pennsylvania tracks. Nearly all the coal produced at the Mayview site goes directly to Cleveland for the Lakes trade.



MAYVIEW STRIPPING PLAN, showing how stream was moved to new channel to permit stripping operations.

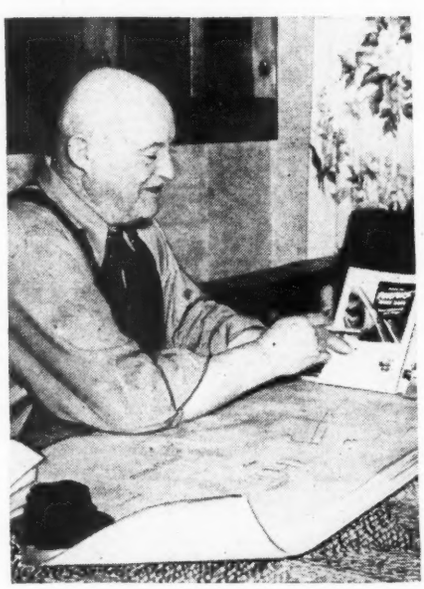


SCOW-HOIST UNIT employing non-interlocking transmission; cover removed to show principal parts. The unit is 9 ft. long, 36 in. wide and 19 in. high. The two drums accommodate 1,500 ft. of ⅜-in. wire-center improved-plow-steel preformed rope. Right-hand view shows reducer, transmission and chain to one hoist drum.

Improved Scow-Mining System

Evolved Out of Experience Going Back to 1926, New Double-Drum Scow Hoist With Non-Interlocking Transmission Lengthens Rope Life Four Times at Jewel Mine, Operating Five 600-Ft.-Long Semi-Longwall Faces

By G. W. REITZ
General Foreman, Jewel Mining Co., Paris, Ark.



G. W. REITZ with drawings of the non-interlocking transmission which he developed.

ROPE consumption on scow-mining equipment at the Jewel Mining Co., Paris, Logan County, Ark., has been substantially reduced by the adoption of a non-interlocking mechanical transmission. The non-interlocking feature of the transmission protects the wire rope against the strains often accompanying changing the direction of travel in scow operations. Moreover, more of the crew are kept away from the face through the use of a remote-control system. Hence, face accidents are reduced.

Scow mining at the Jewel mine, operating in the Paris subbituminous seam approximately 20 in. thick, has been one of evolution dating back to 1926, when it was originated at this particular operation. Scow mining derives its name from the steel sheet, or pan, used to remove undercut coal on a semi-longwall face. The coal is brought out in 3- to 5-ton blocks and hauled to the surface on flat-bed cars. In the past 21 years, four scow-mining schemes have been used at Jewel.

The first scow system (Fig. 1) used a double-drum hoist set back in the entry with the operator at the hoist. The drums were spooled with 1,500 ft. of ½-in. non-preformed wire rope. The rope ran from the hoist to a sheave at the face of the entry and across half the 600-ft.-long face to a second sheave anchored with a roof jack. From there the rope ran back under the coal at the back of the 4-ft. cut, then under the scow, being attached to both ends of it, and on to the sheave anchored at the other end of the face. From this sheave, the rope continued back to a second entry sheave and thence to the hoist. Taking 4 ft. of bottom on the haulage entry permitted mounting one drum over the other on the scow hoist.

A rope attachment on the cutter-bar placed the rope at the back of the cut as the cutting machine advanced along the face. The entry track was extended past the two-drum hoist, where a winch with a ⅜-in. rope was used to pull the coal from the scow over a loading chute onto the flat-bed mine car.

In loading the scow, the hoist operator positioned it under the proper section of face. Then, a section of coal was pried down on

to the scow, following which the operator reversed the hoist and pulled the loaded scow back to the entry. Here, the ⅜-in. rope was looped around the coal (a lump weighing about 3 tons) and it was pulled across the chute to the flat-bed mine car. The scow then was pulled back along the face, in one direction or the other, for another load.

This early method of scow operation proved costly and wire rope lasted but a short time. Lack of working room at the face presented a serious accident hazard.

In the second method (Fig. 2), the entry was kept ahead of the face. In this instance, an 8x16-ft.-long steel sheet provided a mounting for the hoist, drums, power unit, speed reducers and coal-loading winch. Track was laid over the plate to permit cars to bring out the coal and excavated rock. Operation was the same as with the first method except that no loading chute was required. Some of the disadvantages of the first method were overcome in that more working room was available, but the operation still was dangerous, rope replacements were numerous and the operation slow.

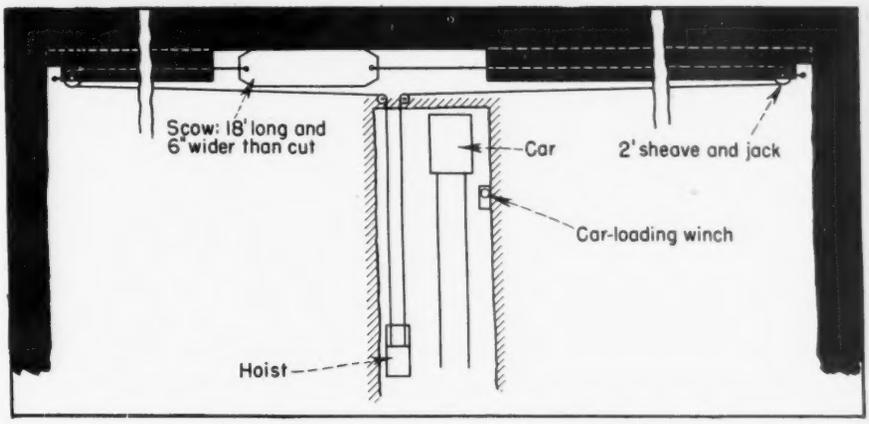


FIG. 1—FIRST scow-mining method at Jewel mine.

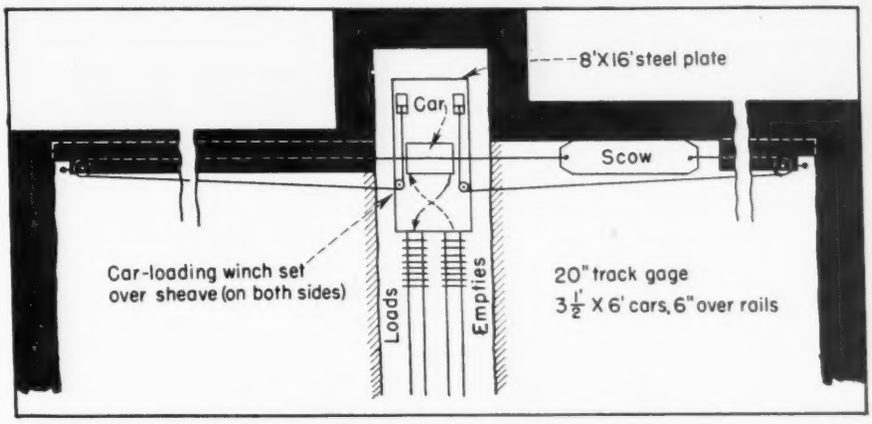


FIG. 2—SECOND Jewel scow-mining method.

Endless Rope Employed

A third method employed an endless-rope scheme. Each wrap of the rope (preformed type) circled two drums in tandem. The drums and power unit were assembled in a steel box 9 ft. long, 3 ft. wide and 19 in. high. The unit was operated from a remote-control station 20 to 30 ft. down the entry. Thus, the hoist operator was moved some distance away from the face, increasing the safety of the operation. As before, a second hoist, or winch, was used to transfer the coal from the scow to the car. Aside from the safety factor, placing the hoist parallel to the face, with the drums pulling more in line, was an operating advantage. However, there was one big drawback. With seven or eight wraps of rope on both drums and operating, through necessity, with tight drums, the load built up between drums until the bearing pressures became enormous. Slippage of the ropes tended to wear the outer grooves more than the center ones and this increased the strain on the rope when it passed over the center grooves.

Since the rope for a scow operation of this type must be twice the length of the longest wall,

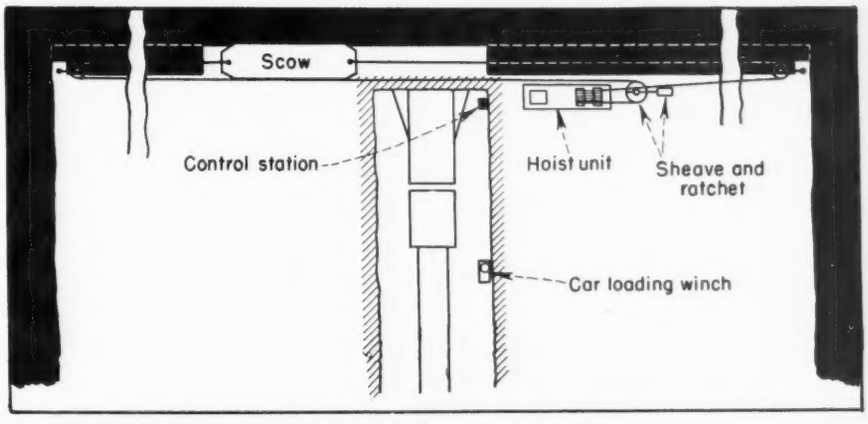


FIG. 3—THIRD Jewel scow-mining method and the first to use an endless rope.

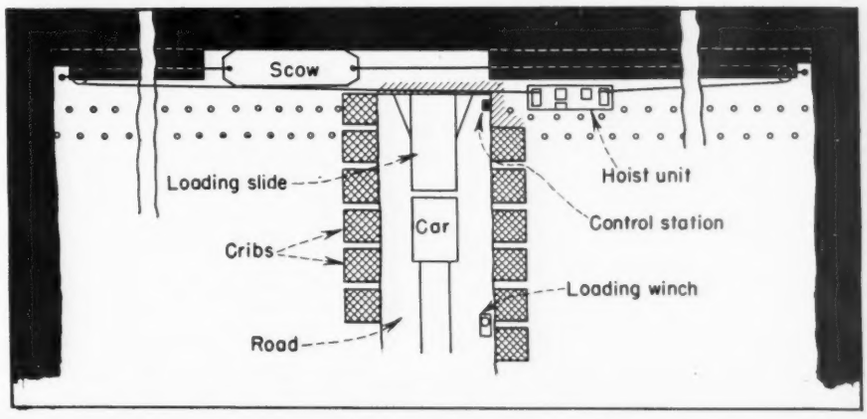
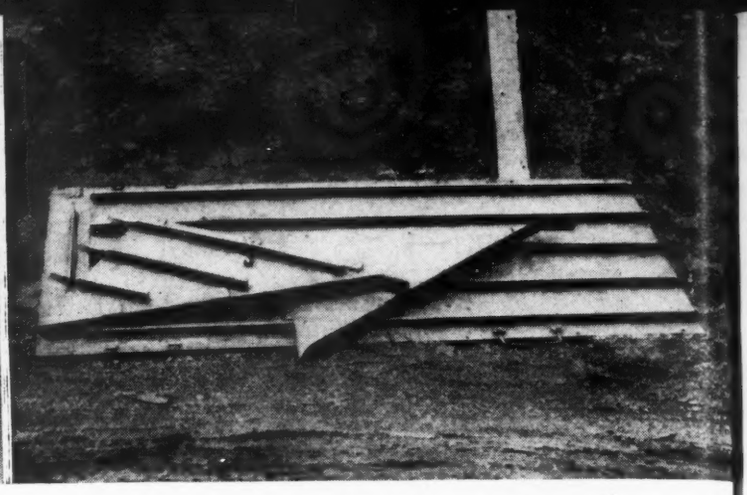


FIG. 4—FOURTH scow-mining method using non-interlocking transmission—the answer.

FLAT-BED CARS used at Jewel mine shown in the slope opening. Cars are 5 ft. wide and 10 ft. long.



ONE OF THE three-part slides used for loading cars at Jewel mine, showing ribbed bottom construction.

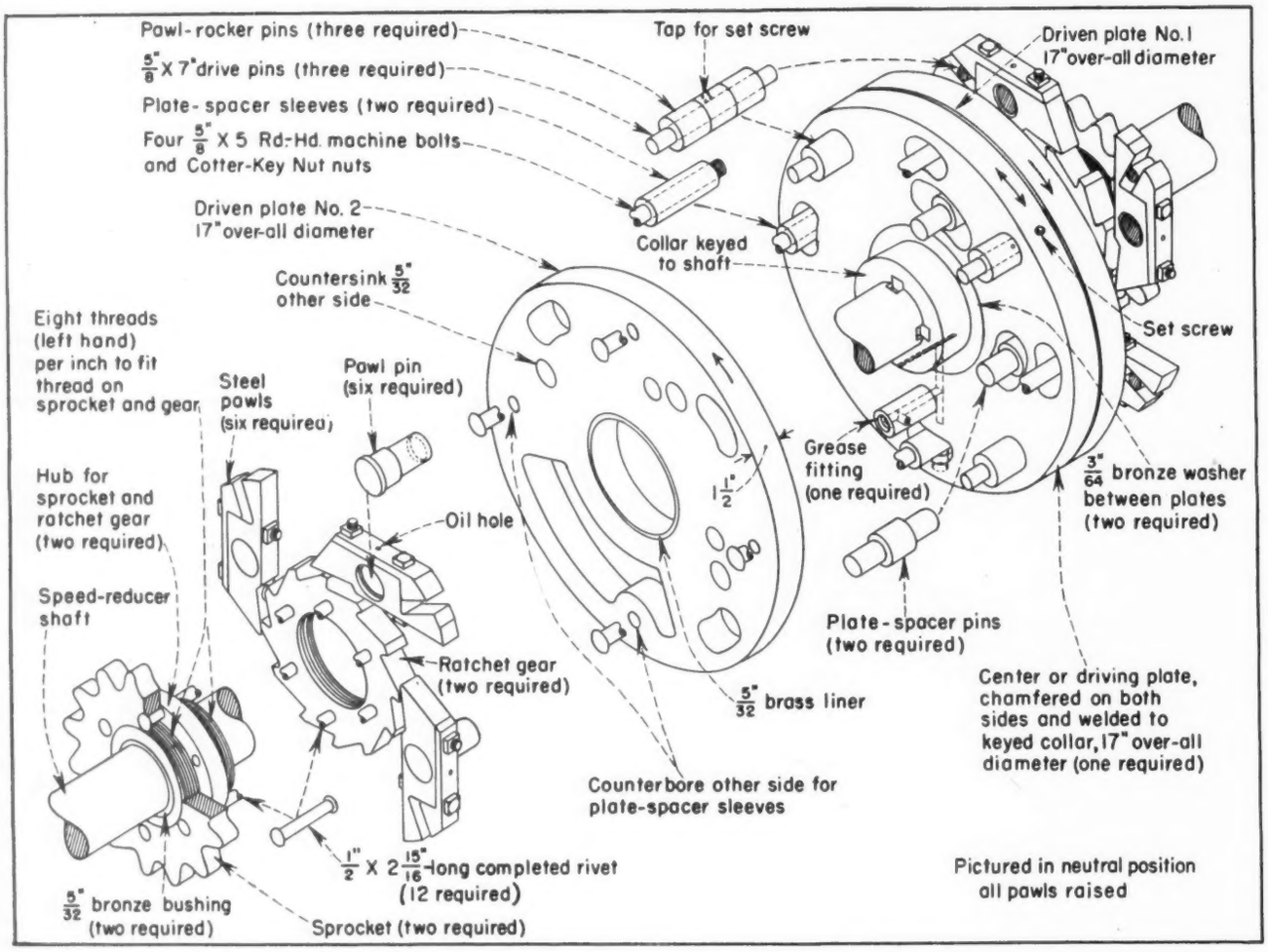

Pawl-rocker pins (three required)
5/8" X 7" drive pins (three required)
Plate-spacer sleeves (two required)
Four 5/8" X 5 Rd.-Hd. machine bolts and Cotter-Key Nut nuts
Driven plate No. 2 17" over-all diameter
Countersink 5/32" other side
Eight threads (left hand) per inch to fit thread on sprocket and gear
Steel pawls (six required)
Pawl pin (six required)
Hub for sprocket and ratchet gear (two required)
Oil hole
Speed-reducer shaft
Ratchet gear (two required)
1/2" X 2 15/16" long completed rivet (12 required)
5/32" bronze bushing (two required)
Sprocket (two required)
Tap for set screw
Collar keyed to shaft
Driven plate No. 1 17" over-all diameter
Set screw
Grease fitting (one required)
1 1/2°
3/64" bronze washer between plates (two required)
Plate-spacer pins (two required)
5/32" brass liner
Center or driving plate, chamfered on both sides and welded to keyed collar, 17" over-all diameter (one required)
Counterbore other side for plate-spacer sleeves
Pictured in neutral position all pawls raised

FIG. 5—HEART OF THE endless-rope scow-mining system at Jewel mine is this non-interlocking transmission, shown here in partly exploded form and described in detail on the following page.

plus 60 to 70 ft. wrapped around the drums, slippage ground out the drum grooves in a very short time and at the same time increased the pressure on the drum shafts. To ease this situation, we tried changing to ½-in. preformed wire rope. Spooling was some better and rope life was considerably increased, but tightening between the drums remained. Consequently, drums had to be removed and rebuilt frequently and the wire-rope replacement cost was still far too high for satisfactory operation.

As the basis for the fourth and present system, a new power unit was built around a double-drum hoist with the two drums hooked together by a non-interlocking transmission. The entire unit was inclosed in a steel case the same size as that for the unit used with the third system. The hoist unit was placed along the face, as in Fig. 4. With the power unit between the drums, the latter exerted a direct pull on each rope. Remote control permitted putting the operator back in a safe position in the entry, where he could also hook the winch rope around the coal.

Five of these new units have now been in service more than two years. Only one has had to be brought out for repairs or correction. Results are 100 percent better than with any previous equipment. With the present set-up and preformed rope, rope life is four times longer than with any of the

previous systems just described.

The hoist units are powered by 15-hp. motors, which drive the drums through speed reducers and the non-interlocking transmissions. With this transmission, there is no chance of snapping a wire rope because the ratchets used will not engage in the opposite direction until all tension on the rope is released. Because of the preforming of the rope used, surface wires, when they break, hold their place. Consequently, when the rope passes under the heavy burden of coal, there is no tendency for broken wires to flare out and build up snarls.

In scow operation at Jewel mine, one rope pays out from one drum while the other rope pulls the load. This results in considerable stretch in the load rope—as much as 4 to 5 percent or more. When the power is cut off, this stretch is released and causes the load drum to rebound unless there is some means of preventing it. Under the Jewel set-up, also, it is impossible to use the ordinary type of ratchet where one pawl takes hold before the opposite one releases. This was the bug in the earlier systems.

New Transmission Designed

Since an interlocking transmission would not work, we developed the non-interlocking one previously referred to. With this new transmission (patent applied for), the two drums are driven from a single shaft, one wire rope paying out while the other winds in, irrespective of the length of rope required or the load.

With the usual equipment, using the conventional ratchet, an operator is required if two drums are to be satisfactorily hooked up to handle heavy loads, using one power source. If remote control is attempted, the price is a big rope-replacement cost. In other words, when full load is put on 300 to 400 ft. of rope, a 4- to 5-percent stretch is bound to result. When the direction is reversed, slack is taken up in the other rope before the stretch is completely out of the first.

Construction of the non-interlocking transmission is shown in Fig. 5. It is assembled on a shaft driven through a speed reducer by a 15-hp. motor. The sprockets accommodate roller chains which drive the hoist drums, one at each end of the unit, as shown in the accompanying photographic illustration. By using plates instead of sprockets, the hoist drums could be mounted directly on the power shaft, and this has been done in another type of operation.

The main point is that the source of power for the non-interlocking transmission assembly must be directly connected to the center plate. The pawls are on the two outside plates and are set in opposite directions. The drive pins are solid in the center plate and travel in slots in the side plates. The pins must travel to one end of the slot to drive in one direction, and to the opposite end to drive in the other.

When the driving pins are in the center of the slots, all pawls are released or neutral. One set of pawls cannot be engaged while the other set is out. If there is reverse pull on one set of pawls (such as that from the 4- to 5-percent stretch in the wire rope), these pawls cannot release until the operation is reversed sufficiently to bring the pins to the central, or neutral, position in the slotted holes. Therefore, opposite pawls cannot engage until all tension is released and the rocker pins pass the center on their way over to the other ends of the slots.

While the center plate is the source of power, it is the side plates with pawls in opposite directions that must come to neutral position and drop over to engage the opposite ratchet gear that make the transmission non-interlocking.

The center plate of the transmission is chamfered and welded to the hub on which the two side plates are fitted loosely over bronze bushings with washers between. This permits these plates to move freely on the hub, which is flush with the plates and keyed to the drive shaft.

The two side plates are bolted together through slotted holes in the center plate. Spacers prevent binding on the center plate when the side plates rock back and forth. Sections are cut out of the side plates so that they are out of balance. When motion in either direction stops, they will drop back to neutral. As the pawls are attached to one side plate in one direction and to the other in the opposite direction, and as both plates act as one, rotation in one direction causes one set of pawls to engage. If the direction is reversed, the opposite set of pawls engages while the others release. If there is any force on one set of pawls, such as that resulting from the stretch in the wire rope, the opposite set cannot engage until such tension is relieved sufficiently to permit the pawls to drop back to neutral position. Both side plates are made the same, the direction of the pawls being reversed by turning one plate over before counterboring.

For use when necessary, each drum of a hoist unit is fitted with a squeezer-type brake, or retarder, with screw-type control. The accompanying photographic illustration shows this brake in place.

Five sections, each 600 ft. long, are worked at Jewel mine. Cutting (5-in. kerfs) is done by longwall machines with 4-ft. bars. The cut is made in the bottom under the coal. Average seam thickness, as noted, is 20 in. Each section produces an average of 100 tons per shift. The standard crew per section, or wall, is made up of two facemen, who cut and load the scow, one man at the winch pulling the coal off the scow onto the cars, one man at the car, one man operating the scow hoist by remote control, two men handling cars and one shift leader. The face is kept open by single posts set to within 3 ft. of the coal.

Scow Load Averages 5 Tons

Length of the scow, made with rounded corners, is 18 ft.; width is 6 in. more than the 4-ft. cut depth. One scow load normally is a section of cut 14 to 18 ft. long and, of course, 20 in. high and about 4 ft. wide. Total weight of the chunk is around 5 tons. It is pulled over a demountable steel ramp (three sections), shown in an accompanying illustration, onto the car, using the winch previously noted.

Cars are brought to the loading point by means of a single track in a haulage road established by cribbing along each side and taking bottom to a depth of at least 4 ft. The top along the haulage road is supported by 16-ft.-long timbers on 3-ft. centers. Cars are loaded on a single-track extension of a double-track system, which provide parting space for both empties and loads. The double track is extended every 10 cuts or so. By keeping the distance from the end of the double track to the loading point less than a maximum of 40 to 60 ft., the two car hostlers generally can push a load out and bring in an empty while the scow is being loaded.

The mine is opened by a rock slope and the workings now are about three-quarters of a mile in. The total number of employees at the operation is approximately 150.

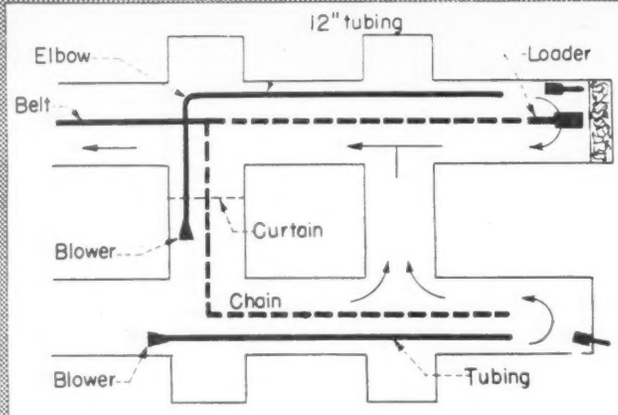


FIG. 1 — USE OF BLOWERS AND TUBING in two-heading entry driven with a loading machine and conveyors.

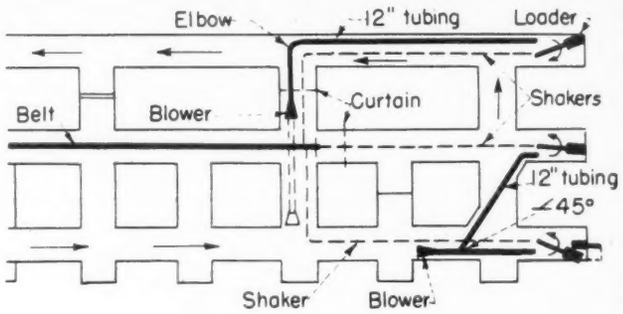


FIG. 2 — THREE-HEADING ENTRY driven by shaker conveyors discharging to belts, showing use of blowers and tubing.

Auxiliary Ventilation for

Layouts for Blower-and-Tubing Ventilation of Mechanical-Loading Sections Using Various Types of Production Equipment—Proper Installation, Use and Care of Blowers and Tubing in Coal-Mining Applications

By J. H. DICKERSON
Mining Engineer, Huntington, W. Va.

WITH LOADING MACHINES working double shift and delivering coal to conveyors, a face may advance more than ten times as far in a day as the average with hand loading into mine cars on a single shift. Conveyors, properly operated, usually will permit a machine to load continuously until a place is cleaned up. Frequently also, cutting and loading machines operate at the same time. With mechanical load-

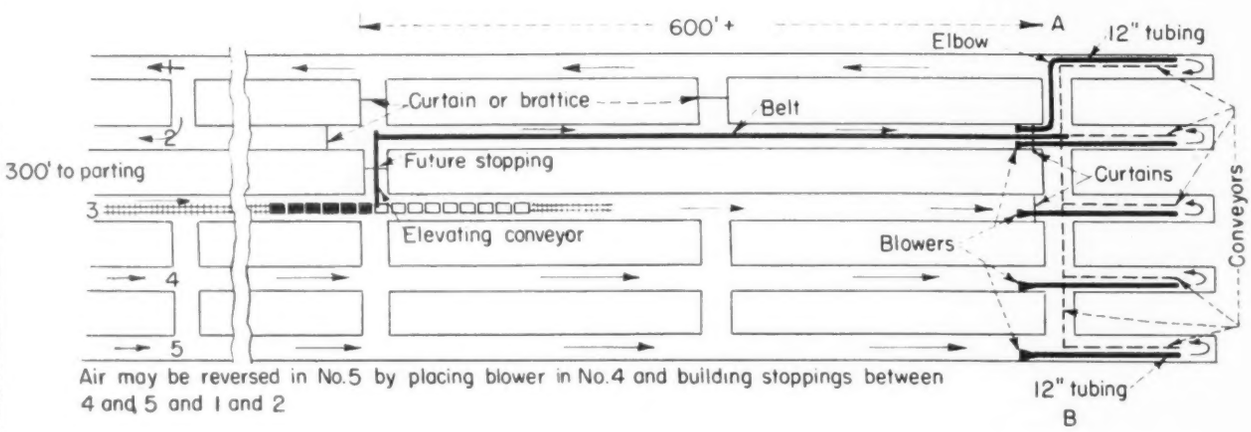


FIG. 5 — FIVE-HEADING CONVEYOR-ADVANCED ENTRY, showing ventilation with blowers and tubing.

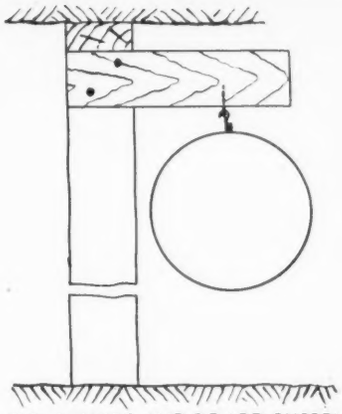


FIG. 3—WIRE-AND-BOARD SUSPENSION of ventilating tubing

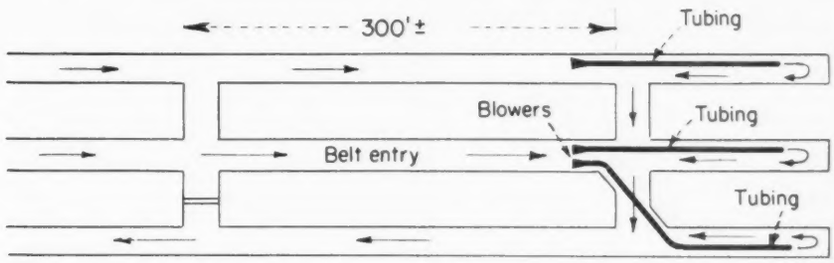


FIG. 4—THREE-HEADING BELT ENTRY with blower and tubing for each heading.

Better Mechanical Mining

ing into mine cars, the machine cannot be operated continuously as cars have to be shifted one at a time and a motor crew is required. The loader usually has a larger capacity than one for conveyor loading and makes more dust in operation, while cutting machines and drills seldom operate in a place while the loader is working.

With conveyors delivering coal to mine cars from several loading machines at the same time there is a considerable saving in labor. However, places advance so rapidly that ventilation is inadequate without auxiliary equipment. Places are cut, shot, loaded out, timbered and so on three to five times per shift. Dust from cutting, loading and shooting is many times greater than with hand loading and the dusty air, together with increased gas and smoke from shooting, must be removed.

Several times as many men may work in a loader-conveyor area as the average in a hand-loading territory. They require more air and, if there is any methane, it is released more rapidly by the fast advance. This also calls for more air in motion at the face.

Auxiliary ventilation with line brattice takes more time for installation and extension than should be required for blowers and tubing—and the latter should be more efficient. However, with the rapid changes in the methods of mining, the use of blowers and tubing should be planned carefully. To help in preparing plans for auxiliary ventilation, this article presents some typical layouts for the use of blowers and tubing in connection with various types of conveyors and loaders.

Fig. 1 shows a two-heading entry with a loader serving the two headings. Entries are advanced and rooms later are worked on both sides. Chain conveyors deliver the coal to a belt conveyor, taking it from both the heading faces, and later on, the rooms. This plan is used in an all-conveyor mine. It can be seen that the men could not operate the cutting and loading machines continuously and get five cuts per shift satisfactorily without auxiliary ventilation. Fig. 1 also shows the arrangement of the blowers and tubing.

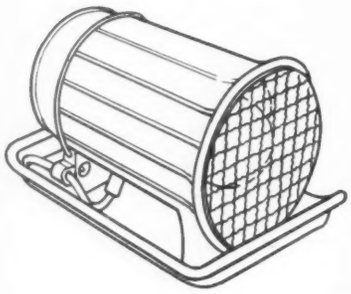
Tubing should not be permitted to lay on the floor or gob. It may be suspended quickly and easily from a wire attached to boards nailed to posts as shown in Fig. 3, from the boards themselves if the posts are sufficiently close. Blowers should be operated continuously except when shooting, and adequate air should be maintained in the entry.

Fig. 2 shows a three-heading entry with rooms necked on one side. However, it is intended to develop the entry to the limit and then come back with rooms on both sides. This provides two intake airways and reduces the quantity of air in the belt heading. It also tends to reduce dust and provides better protection for the belt when rooms are driven on both sides.

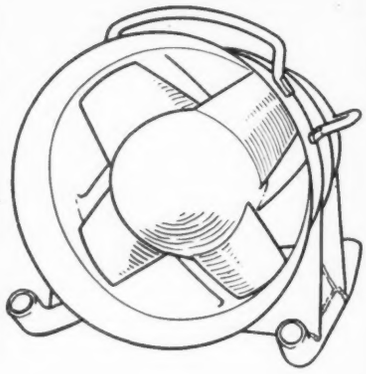
In the advancing work, crosscuts to the return airway are made only every other room. This reduces the cost of stoppings and insures better air. One blower is used for the two headings. The two lines of tubing should be connected with a fitting having a 45-deg. side outlet. Corners of the crosscut should be cut to secure better tubing alignment. As three shaker conveyors deliver coal to the point where the second blower is located, there may be considerable dust at this point. In this case, the blower may be placed on the other side of the belt, as indicated. Shaker conveyors are shown with duckbill or. sawbill loading heads. While tubing may be curved around fairly sharp bends, it is advisable to use an elbow for a right-angle turn in a narrow place, since it reduces resistance and provides more air.

Fig. 4 shows development on an entry on which rooms will be worked on both sides when it has been driven to its limit. It is planned for a 2,000-ft. belt in the center heading. The headings may be driven from the last crosscut by shaker conveyors with duckbills. Tubing from the blowers is to extend the 300 ft. between crosscuts. The blower for the return airway is placed in the middle airway. Because of the length of tubing required, it is better to use separate

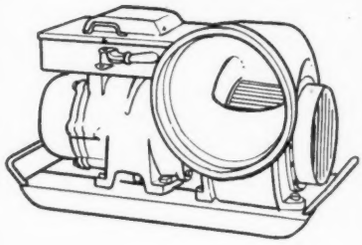
TYPES OF BLOWERS FOR AUXILIARY MINE VENTILATION



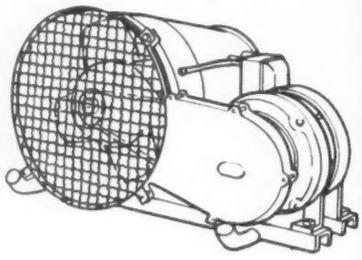
PORTABLE TUBING BLOWER



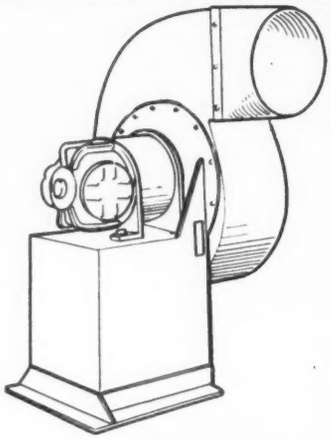
INTAKE PORTABLE TUBING BLOWER



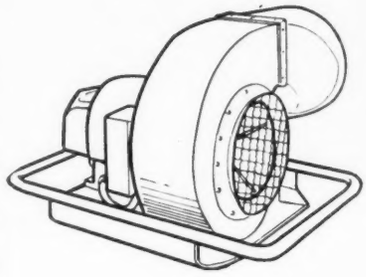
RIGHT-ANGLE DISCHARGE



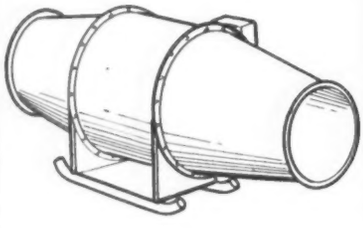
BELT-DRIVEN BLOWER



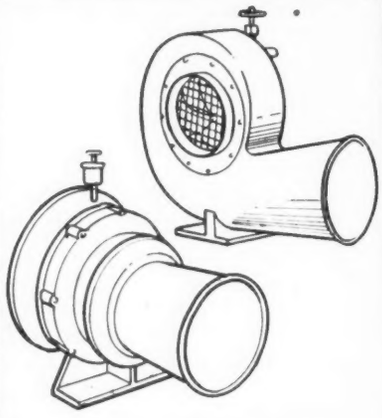
45-DEG. ADJUSTABLE-DISCHARGE UNIT



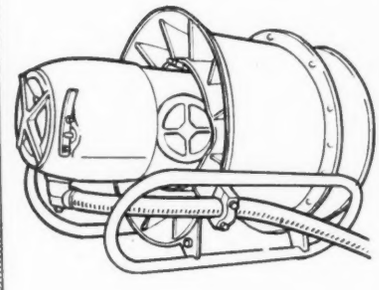
HEAVY-DUTY BLOWER



BLOWER FOR USE IN TUBING LINE TO REDUCE PRESSURE AND LEAKAGE



COMPRESSED-AIR BLOWERS



MOTOR ON PROPELLOR SHAFT

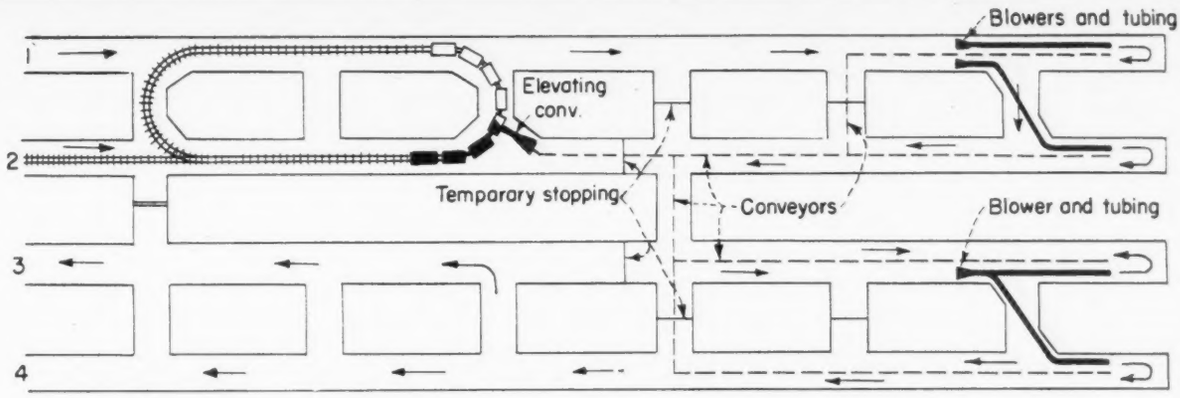


FIG. 6 — BLOWER-AND-TUBING VENTILATION of four-heading entry with loop track for loading cars.

Tubing should be suspended and blowers may be, as shown in this illustration.

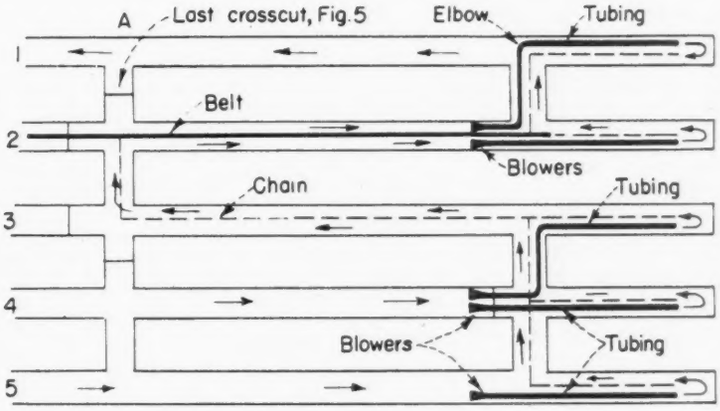


FIG. 7 — METHOD OF EXTENDING ENTRY shown in Fig. 5 to get additional use of loading point; air flow is easily reversed with blowers and tubing.

blowers rather than one for the two places as shown in Fig. 2.

Because of the increased length and curvature of the tubing, the return airway in Fig. 4 will not get as much air as the other headings unless the blower is speeded up or the blower or tubing are larger in size. As the blowers in the center heading are near the point where the belt conveyor takes coal, it may be quite dusty. Consequently, the blowers should be set farther back or a curtain should be installed ahead. As rooms are worked only on the retreat, it is desirable to drive the entries to the limit as quickly as possible. The crosscuts are made at the centers for every sixth room. Not starting the intermediate rooms saves considerable time, reduces the cost of stoppings, etc. For room entries with belts and rooms on two sides, the reader may consult the May, 1947, issue of *Coal Age*, p. 90.

Fig. 5 shows a five-heading main entry intended to provide three intake and two return airways. However, there is only one return in the advance workings until a stopping is put in the crosscut where the elevating conveyor is located. With four intake airways, it will be necessary to put a check curtain ahead of the blowers in the belt heading—and probably in the track heading—to reduce dust and insure satisfactory distribution in the other headings.

If top or bottom has to be taken and timbers set in the track heading, it can be done while cars are being loaded at the point shown in Fig. 5. By extending the belt another 300 ft. and using an extra 300 ft. of conveyor in No. 3 heading, as shown in Fig. 7, the headings may be extended another 300 ft. without moving the loading point shown. This will make the loading point and parting serve for 1,200 ft. of entry. Fig. 7 shows another way in which the direction of air flow may be changed readily in entries using blowers and tubing.

By reducing the number of stoppings through the use of blowers and tubing, with other means as indicated, there will be a big saving in the cost of stoppings and their maintenance. In a big mine, however, there may be an even larger saving in the cost of power for ventilation, as it is practically impossible to prevent leakage through stoppings. If more than five headings are required, other plans can be made for using conveyors from loading machines to mine cars or belts to the outside. Mines with all-conveyor haulage are increasing. The return air in Fig. 5 may be carried in both outside headings by placing the blower in No. 4 instead of No. 5 and building stoppings between Nos. 1 and 2, and 4 and 5. This is sometimes desirable where old workings have to be sealed off on a return airway.

Fig. 6 shows an entry made up of four headings, which frequently is desirable. Two intakes and two returns are provided. Headings 1 and 2 are intakes and 3 and 4 are returns, but the air is re-

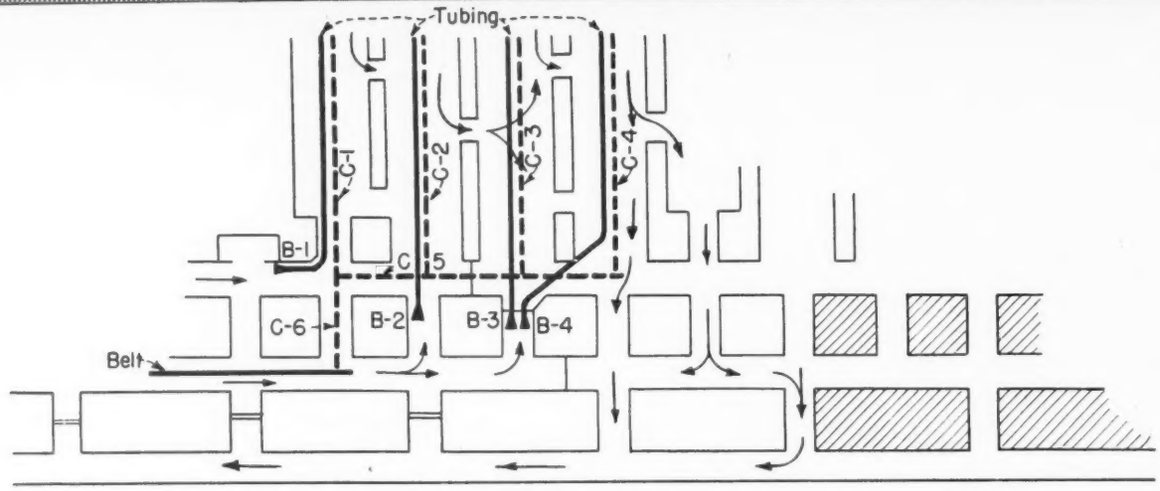


FIG. 8 — WORKING FOUR ROOMS retreating on one side of an entry with blowers and tubing.

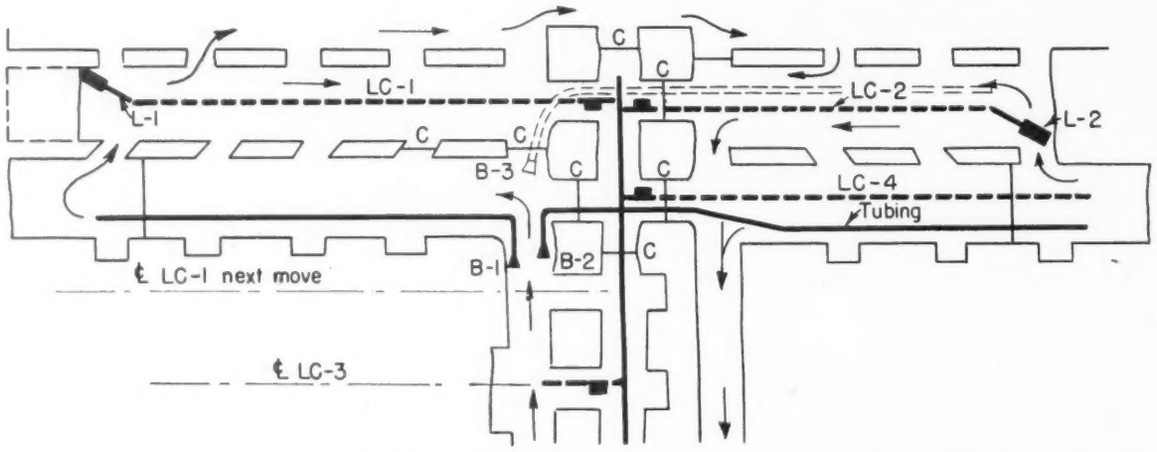


FIG. 9 — MOBILE LOADER-CONVEYOR PLAN with two rooms on each side of the entry

versed temporarily in Nos. 2 and 3 ahead of the last crosscut. One or two blowers may be used for Nos. 1 and 2, and Nos. 3 and 4, as desired. They are shown both ways.

The conveyors in Fig. 6 take the coal to a loading point on a loop for cars. It will be noted that this loop is in the two intake airways. The loop should never be partly in an intake and partly in a return, as frequently shown, as it is impossible to place curtains to deliver sufficient air to the working places ahead while the loop is being used. The loop saves switching time where there are only a few cars. An extension of the conveyor system may save the cost of another loop and loading point, and will save time for the haulage locomotive.

Fig. 8 shows four rooms being worked on the retreat on one side of a triple-heading entry. Conveyors are shown as "*C*" followed by a number; blowers as "*B*." The rooms are worked abreast so that the equipment can all be moved at one time. One or more of the conveyors may be placed to remove as many of the entry chain pillars as desired while the extra conveyor parts are being moved.

Fig. 9 shows two rooms on either side of triple-heading entries, such as in Fig. 4. Rooms ahead have been worked out. This plan is intended for a mobile loader serving two places and loading onto chain conveyors. It will be noted that the outside room on either side of the entry is about two shifts ahead of the inside room, and that one room on the left has been completed while the opposite room is still being worked. The driving head with a few pans of Conveyor LC-3 for the completed room have been moved down to their new position. The remaining pans can be moved later. With these out of the way, the drive head and few pans of Conveyor LC-1 will be moved down to their new position. Extra pans for LC-1 may be moved later, when convenient, followed by moving LC-2 when its room is completed.

Pans for the extension of Conveyors LC-3 and LC-4 will be placed in the outside headings ready for use when required. If roof conditions are favorable and the work is carefully planned, pans for LC-1 and LC-2, in their next location, could be piled in crosscuts started from the completed outside rooms. This would greatly shorten the moving distance.

With the outside rooms ahead of those on the inside, the latter may be ventilated fairly well by the blowers and tubing used for the outside rooms—with the addition of some curtains. The inside room on the return airway will not get as good ventilation as the one on the intake and a larger blower or larger tubing may be desirable to put more air to the face of the room worked by Conveyor LC-4. More-adequate air could be obtained by a third blower, B-3, with tubing as indicated. Curtains are indicated by

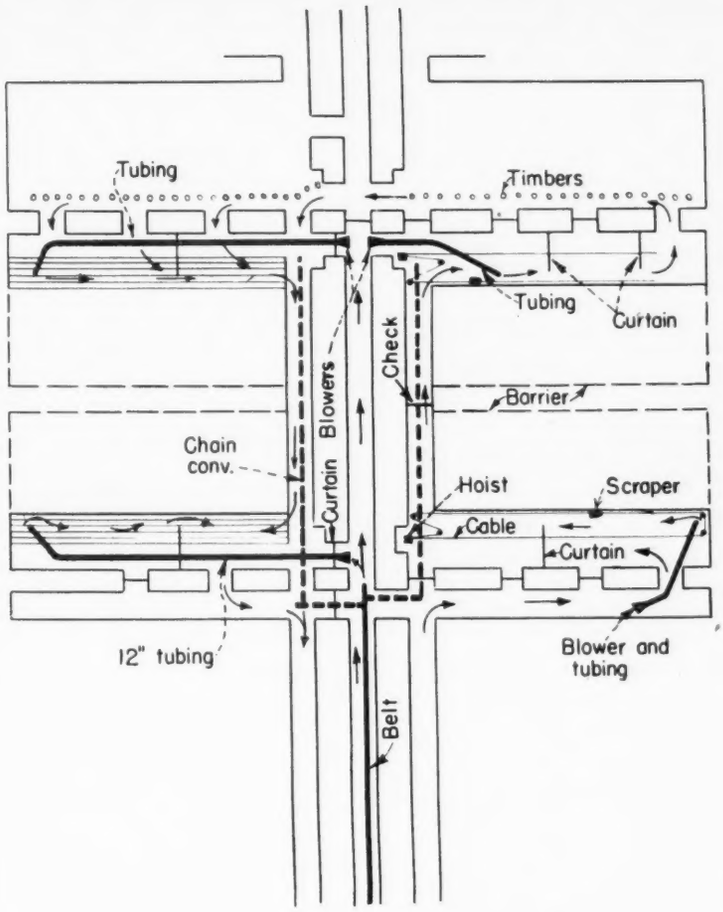


FIG. 10—LONG-FACE SCRAPER-MINING PLAN showing ventilation with blowers and tubing.

the letter "*C*." With curtains as shown, the air where the conveyors discharge to the belt will be very moderate and consequently dust in the air will be reduced.

Fig. 10 shows four long scraper faces delivering coal to chain conveyors, which in turn discharge to a belt conveyor in the center heading. Such long dead-end faces never have been ventilated very satisfactorily. Each face shown is started from the side of a pair of downholes. As the first on the right is widened out, the air velocity will decrease and air will not travel freely to the outer end of the face without a brattice line or a blower and tubing. The latter is preferable because it can be extended easily to deliver a strong current to the outer end of the face, from which it will flow back toward the heading. However, a deflecting curtain is needed to keep the air from spreading out away from the face.

The second face on the right in Fig. 10 is rather difficult to ventilate but a blower may take fresh air from the middle heading—which such plans generally do not provide—and deliver it as indicated. About half the intake air will have to go through the old scraper area to the return airway, and a good row of timbers or cribs may be required. The two faces on the left may be ventilated by blowers, tubing and curtains, as indicated. The tubing is extended as the faces advance.

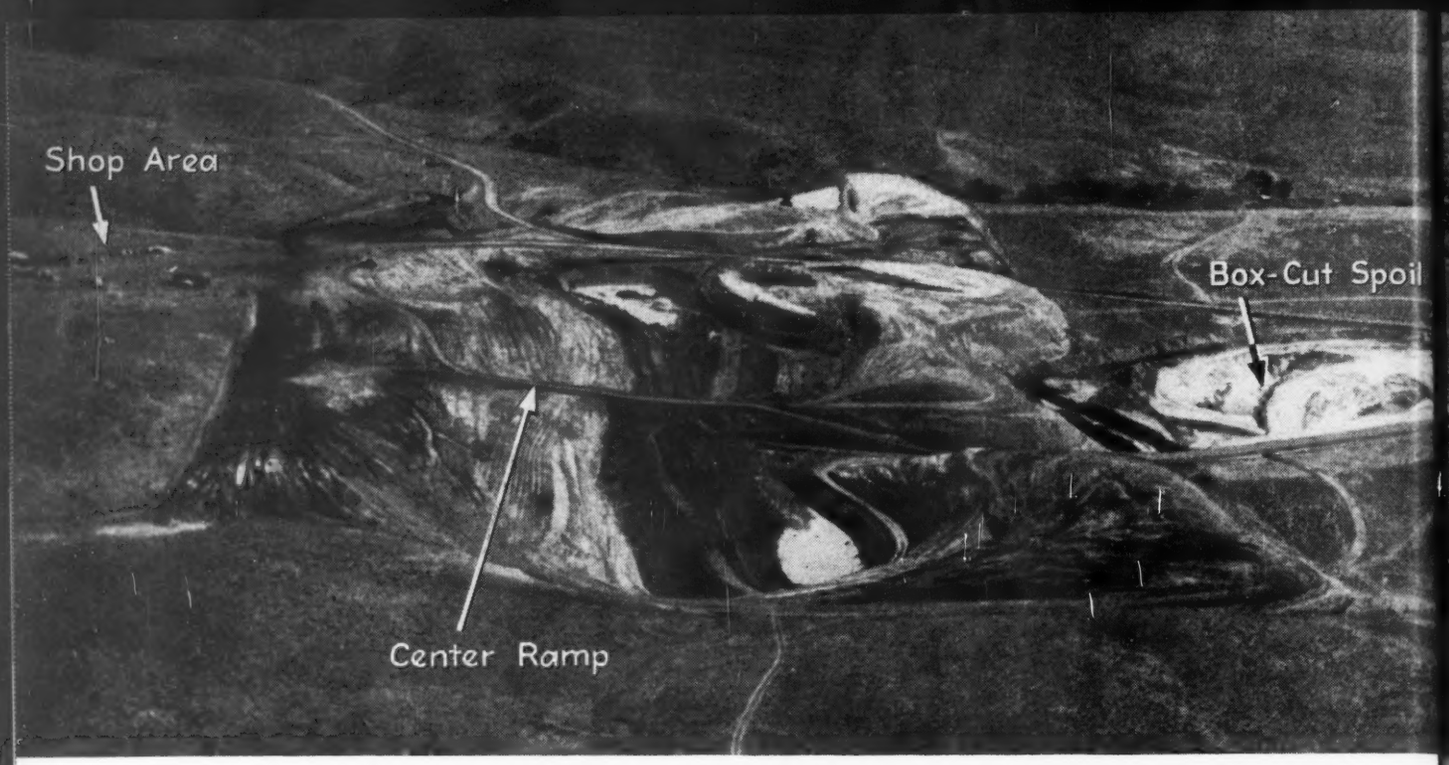
Plans for blowers and tubing should be made to suit the conditions at each mine where they are used. Unfortunately, many published plans and pictures show improper installation and use. Blowers frequently are placed where the air will be recirculated or where they will take in dust from conveyors and the like.

Blowers sometimes are not kept oiled, set firm and level or properly wired. Again, they may be placed near inflammable material or where they may be damaged. Often, they are not started promptly after they have been stopped for shooting. Tubing is made for suspension but it frequently is laid on the floor or gob where it is subject to unusual wear, damage and injurious moisture. Again, it may not be coupled properly and when it is damaged so as to cause leaks it may be continued in service without repairs. When tubing is kinked, it increases resistance and reduces the output. Tubing is easy to repair and there is no excuse for continued use of leaky tubing. A reduced volume of air discharged from the tubing indicates something wrong with either the blower or the tubing.

The proper placement of a blower is not difficult if plans are furnished and operating men are instructed in a few simple points that need attention to insure a satisfactory installation. In many cases, where height permits, it will be advantageous to suspend the blower with hanger rods or place it on a bracket or suspended platform with a metal base. It is not difficult to test the air for recirculation where the blower is set. For similar conditions, it will always be the same.

If air in the intake is stopped, as a result of a door being left open or other short circuit, there will be recirculation at the blower. This, however, is not the blower's fault. Explosions have occurred when doors have been left open and blowers were not used, but if a stoppage of air occurs a blower should be stopped before a dangerous condition develops. With either line brattice or blowers, the foreman should take suitable action, when necessary, to remove men and restore the regular air current. With blowers and conveyors from loaders to mine cars, a red light could be installed to show failure of the main air current near the point the mine cars are loaded and this could be supplemented by definite instructions to the car loader, or trimmer, as the proper action to take.

Properly employed, blowers and tubing are very useful and should not be considered merely an expense. They will save much lost time and reduce accidents by their quick action in removing dust, smoke, gas and foul air. Correctly installed, they are on the intake airway and consequently provide the men at the face with practically fresh outside air, which will permit them to work more efficiently and promote their health. Blowers also should relieve the outside fan of some of the load and this may mean a substantial power saving (see *Coal Age*, December, 1946, p. 96).

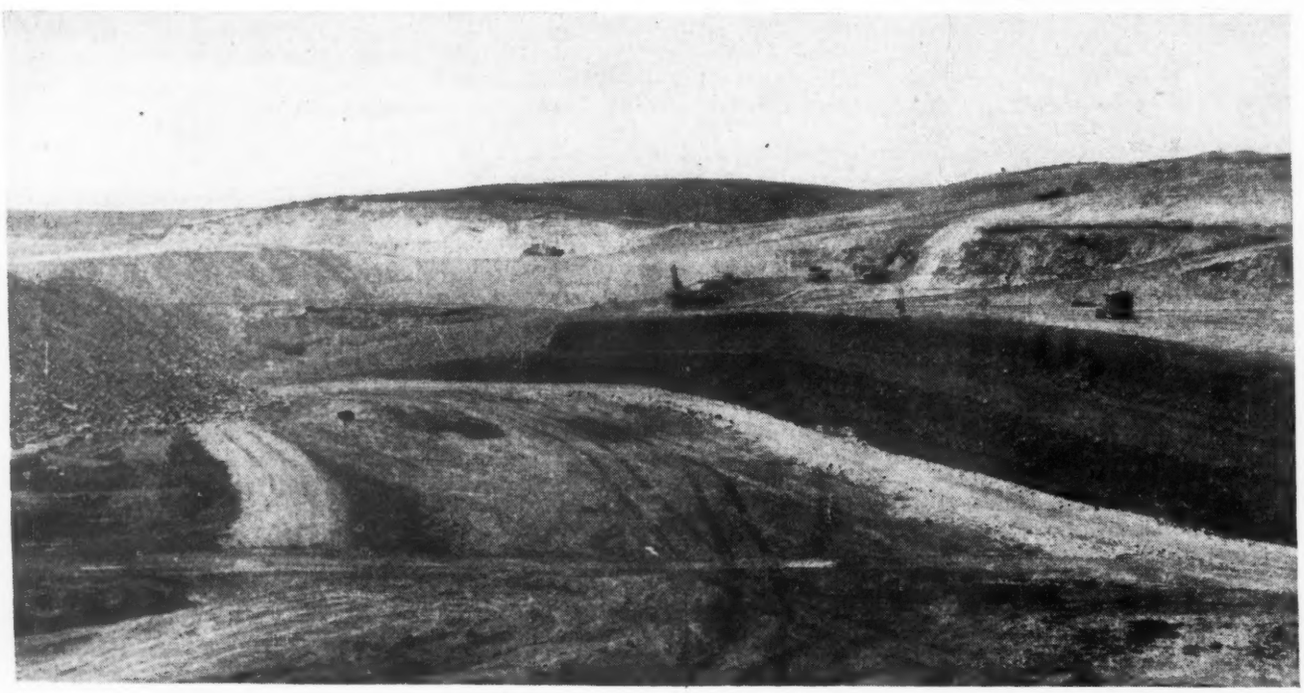


BIG HORN STRIPPING from the air, showing (above and at the right) two views of the general pit layout.

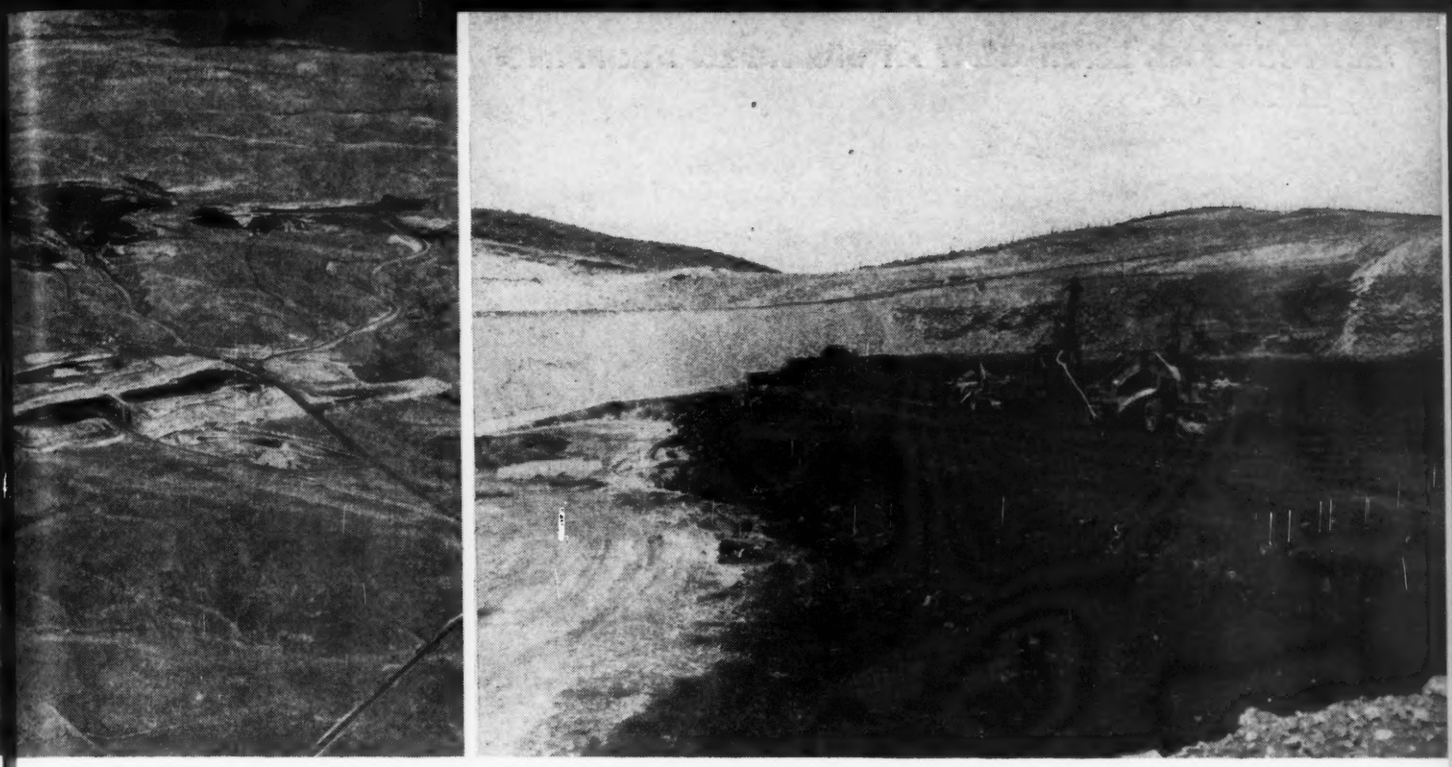
Scraper Stripping at Big Horn

Recovering Two 10-Ft. Benches Separated by a 1-Ft. Parting, Big Horn Uses Scrapers to Remove Top Scoria Layer and Shovel and Trucks to Handle Shale — Two Preparation Plants Handle Rail and Truck Shipments

LARGEST STRIP MINE in the state, the Big Horn operation of the Big Horn Coal Co., 12 miles west of Sheridan in the Powder River field of Wyoming, has been developed, using contractor-type equipment, to a capacity of 2,250 tons per shift. One shift is worked per operating



BIG HORN PIT looking west. In the background, scrapers are moving scoria to the left, while the shovel loads shale.



SCRAPERS AND BULLDOZER removing 1-ft. parting between 10-ft. benches.

day in the summer and two in winter. Opening of the property was started in 1943 and the first coal was shipped in 1944. The company is a subsidiary of Peter Kiewit Sons' Co., a building and construction organization operating from the Middle- and Southwest to the West Coast.

The official staff at Big Horn includes the following: Geo. A. Nugent, general manager; R. M. ("Bob") McManis, sales manager; Fred Lowell, general superintendent; Gail Loop and Ed Temple, pit foremen; Guy Fleming and Charlie Birdie, tipple foremen; Red Day, shop foreman; C. A. Johnsen, sales-office manager; C. A. Kirby, production-office manager; Bill Long, mining engineer; Don Townsend, geologist; and Arnold Hilpert, dispatcher.

Coal produced by Big Horn—of the sub-bituminous type—goes to railroad, industrial and domestic users in 13 western States. Separate plants, both designed and built by the Kiewit organization, are provided for rail and truck shipments. The rail tipple includes a rescreening plant and can produce six primary sizes—five simultaneously for loading on three tracks. Four sizes can be shipped from the truck tipple, which is designed so that surpluses of any one can be transported to the rail plant. Sizes normally made are: 10-in. lump, 10x3 egg, 3x1½ nut, 1½x1 pea, 1x¼ stoker, and screenings (1½-in., 1-in., etc.).

Coal intended for rail loading is

BIG HORN rail tipple (left) and truck tipple (right).

METHODS AND EQUIPMENT AT BIG HORN STRIPPING

SPOIL AREA at west end of pit. Scraper haul, over ramp at end of pit, is kept under eight minutes.

"SNATCH CAT" helping a scraper load loose scoria. Pulling to load avoids possible jackknifing of the scraper.

SHOVEL LOADING gray shale into trucks, which dump on the point in the background.

BIG HORN coal-hauling fleet lined up on an idle day. The 7.2-mile round-trip from pit to tipple averages 30 minutes.

TRUCK FOR lubricating field units and inflating tires.

CRANE AND TOOL truck—one of two at Big Horn.

Big Horn office staff—Charles Garrett (left), cost clerk; Don Townsend, engineer; Lucile Welter, bookkeeper; Betty Dabney, stenographer; Bill Long, engineer; C. A. Johnsen, sales-office manager; and C. A. Kirby, production-office manager.

Fred Lowell (left), general superintendent, with R. M. McManis, sales manager, and Geo. A. Nugent, general manager.

KIEWIT-DESIGNED gasoline-powered lighting unit.

dumped into a 150-ton hopper, from which it is fed to a single-roll breaker, whose function is to keep the top size of the lumps down to approximately 18 in. From this breaker the coal is conveyed to a 60-ton hopper preceding another breaker, which can be used to reduce the feed to minus 3 or 3½ in. when desired for subsequent processing. Otherwise, the coal is bypassed and conveyed to the main shaker screen. The two hoppers provide considerable storage and enable both preparation and loading in the pit to go forward more smoothly and evenly without the usual delays.

Minus 3-In. to Separate Plant

Minus 3-in. coal from the main shaker is conveyed to a separate down-track rescreening plant, where a triple-deck vibrating screen separates it into nut, pea, stoker and screenings. This screen is followed by a crusher which can be used, when desired, to break down nut for additional stoker and other sizes. The crushed coal is returned to the vibrator by a bucket elevator.

Loading equipment includes four box-car loaders and one storage bin, with spiral lowering conveyor for lump. The latter was installed to make certain that no difficulty would be experienced in loading five sizes on the three tracks available.

Coal intended for truck shipment also goes into a hopper preceding the truck plant. From there it is conveyed to a grizzly, on which the large lumps are broken. Screening is done on a triple-deck vibrator producing lump, egg, nut and stoker. A bin is provided for each of these sizes. They are put in the trucks by rescreening-type booms, the breakage being returned to separate storage bins. Breakage, or any surplus of any prepared size, is trucked to the rail tipple. Equipment is provided for oil-treating stoker. Since the coal is clean as it comes from the pit, hand picking is unnecessary. Rail shipments go out over the Burlington R.R. and are billed from Kleenburn, Wyo.

Production at Big Horn is coming at present from a pit in what evidence indicates is the Carney seam. Earlier work at another location was in what the evidence also indicates was the Monarch seam. The property lies in the foothills of the Wolf Mountains—in other words, rolling country about five miles north of the Tongue River and between the Big Horn and Wolf Mountains. The beds in this area are subject to somewhat erratic behavior as to faulting and otherwise, and a comprehensive prospecting program is part of the Big Horn set-up, using both core- and churn-drill equipment.

Overburden Varies up to 85 Ft.

The Carney seam where it is now being worked by Big Horn consists of two branches about 10 ft. thick, separated by a parting about 1 ft. thick. Overburden thickness ranges from 55 to 85 ft. Above the coal is about 30 ft. of tough, springy gray shale. The remainder of the burden consists largely of scoria, resulting

from the burning of an upper bed —a common condition in the West and particularly prevalent in this area of Wyoming and Montana. The pit, in fact, is only two miles from the Montana line. Average dip of the seam is about 3 percent southeast. Dip of the surface is about the same and, consequently, the average thickness of the overburden changes relatively little.

Scrapers Handle Scoria

At present, the loose scoria at Big Horn normally is removed by scrapers, while the gray shale is loaded into trucks by a shovel and hauled out of the pit. Plans call for replacing present stripping equipment with a diesel-powered walking dragline, which will handle everything to the coal and dispose of the spoil by casting. At that time most of the present equipment will be returned to construction work.

Pit equipment, at the time this article was written, was normally about as follows:

Six 15-cu. yd. LeTourneau Super C Turnapulls with Cummins diesel engines.

Two "snatch cats"—special units for assisting the Tournapulls during loading. These are Caterpillar D-8 tractors with special "stingers" consisting of tongues with loops at the ends to engage hooks on the Tournapulls. The "stingers" are a Kiewit development and the tractors have been modified for "snatch" work by turning the ring gear over, providing five speeds backward and two forward. The "stinger" with its 18-in. loop is raised to engage the hook on the Tournapull by a front-end power unit, which is live and ready for use at all times. Pulling Tournapulls to load is preferred to pushing because the latter can result in jackknifing of the scraper, with attendant possibility of damaging the equipment or injuring the operator.

Two Caterpillar D-8 tractors pulling 23-cu.-yd. scrapers.

One "push cat" to assist the scrapers in loading.

One LeTourneau rooter for use as necessary.

One 80-D Northwest diesel shovel with 2½-cu.-yd. dipper for stripping the gray shale.

Four 10-cu.-yd. Euclid end-dump trucks hauling shale to the spoil-disposal area.

One Hardsocg sidewall drill making 4½-in. holes.

One Model 6 Northwest coal-loading shovel with 3-cu.-yd. dipper.

Two Hardsocg vertical coal drills.

One Hough power broom for coal cleaning.

Ten K-8 International gasoline-powered tractors with 15-ton Fruehauf semi-trailers for coal hauling.

One Caterpillar No. 12 road patrol.

One D-8 Caterpillar bulldozer for road and general work.

One Sullivan core drill (prospecting).

One Bucyrus-Erie 27-T churn drill (prospecting).

One fuel-service truck, delivering to storage and dispensing tanks at the pit.

Two welding and repair trucks—each with 5-ton crane, arc welder, gas tanks, torches and tool boxes—for field repairs.

One lubricating truck with one tank for oil and one for grease, plus gasoline-powered air compressor for operating grease guns and inflating tires.

One sprinkling truck—K-8 with 4,400-gal. tank.

One Gorman-Rupp 4-in. pump at lake made near the pit for sprinkling water. Little water is encountered in the pit and normally scoria is dumped in to get the coal-haulage units above the water level and provide a firm base for their operation.

One shop for general repair and servicing.

One shop for washing and greasing.

One 75-kva. Caterpillar diesel-electric unit for shop and general lighting.

Two pit-lighting units developed by Wayne Brockelsby, a member of the Kiewit organization. These 1½-kva. gasoline-powered lighting units include two 750-watt floodlights mounted on masts that can be cranked up and down to put the lights at the most effective height up to 20 ft. Skid mountings make them easy to move.

Ramp Divides Pit

The present Big Horn pit was opened by box cutting and then working up the pitch. Width of the pit is approximately 1,500 ft., and so far coal has been removed for about the same distance up the rise. As shown in the accompanying aerial views, the pit is divided into halves by a ramp through the center. One fork of the main road goes in on the ramp while the other goes around the eastern end to the shop area to the north. Coal may be left to form the ramp or it may be cut through and loaded at intervals and the ramp restored by filling in the gap with spoil material.

In hauling the scoria back to the disposal area, runways are made at both ends of the pit. Normally, as noted, the scrapers work down only to the shale. At times, however, they go down into the shale itself. However, the shale normally is removed by the 80-D shovel and hauled out by the Euclids, using either the center ramp or roads cut in the bank at either end of the pit. With the equipment employed, filling and/or bulldozing can be employed to establish new roads very quickly, practically any place at any time.

Sidewall Unit Drills Shale

To break up the shale for loading the Hardsocg sidewall drill is employed to make holes 40 ft. deep on 18-ft. centers. Each hole is loaded with an average of 150 lb. of 3x16-in. du Pont "Red Cross" explosive. This spacing and loading are necessary to get good breakage of the tough, springy shale.

Hauls for both scrapers and trucks are kept down to limit the cycle of loading and dumping to not over eight minutes. Normally, a circle route is maintained with trucks or scrapers following each other around through the loading and dumping cycle.

Coal Is Bench-Loaded

The coal is bench-loaded, taking the top 10 ft. first. The 1-ft. parting is ripped up with the road patrol or bulldozer and removed by scrapers to the spoil area. The surface then is swept by the power broom and the coal then is clean ready for loading. In removing the bottom bench the coal-hauling semi-trailers operate on the bottom or, if water is present, on scoria dumped in, as previously noted, to get the trucks up out of the water. Trucks enter and leave the pit by inclines built up the sides of the center ramp or, on occasion, at the ends of the pit.

The haul from the pit to the preparation plant is approximately 3.6 miles. The rise from tipple to pit is 150 ft. and the haulage units make the round trip in an average of 30 minutes. The road was made with a deep base of coarse scoria topped off by a running surface of crushed material. Plans call for dressing the top with oil. At present the sprinkling truck makes regular trips over this main road as well as over all other pit and temporary roads.

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When Exide-Ironclad Batteries supply the motive power for locomotives, trammers and shuttle cars, production hits a faster pace . . . and keeps it up straight through to the end of every shift. For Exide-Ironclad Batteries have that extra capacity and ruggedness that mine haulage service demands.

The many superior qualities of Exide-Ironclad Batteries are due to their special design and construction, which differ from all other batteries. The positive plates consist of a series of slotted tubes which contain the active material. So fine are the slots that, while they permit easy access of the electrolyte, they prevent the active material from readily washing out. Not only does this add to life of plates . . . and battery . . . it also provides higher power ability and capacity, assuring dependable, day long performance with maximum safety and minimum maintenance.

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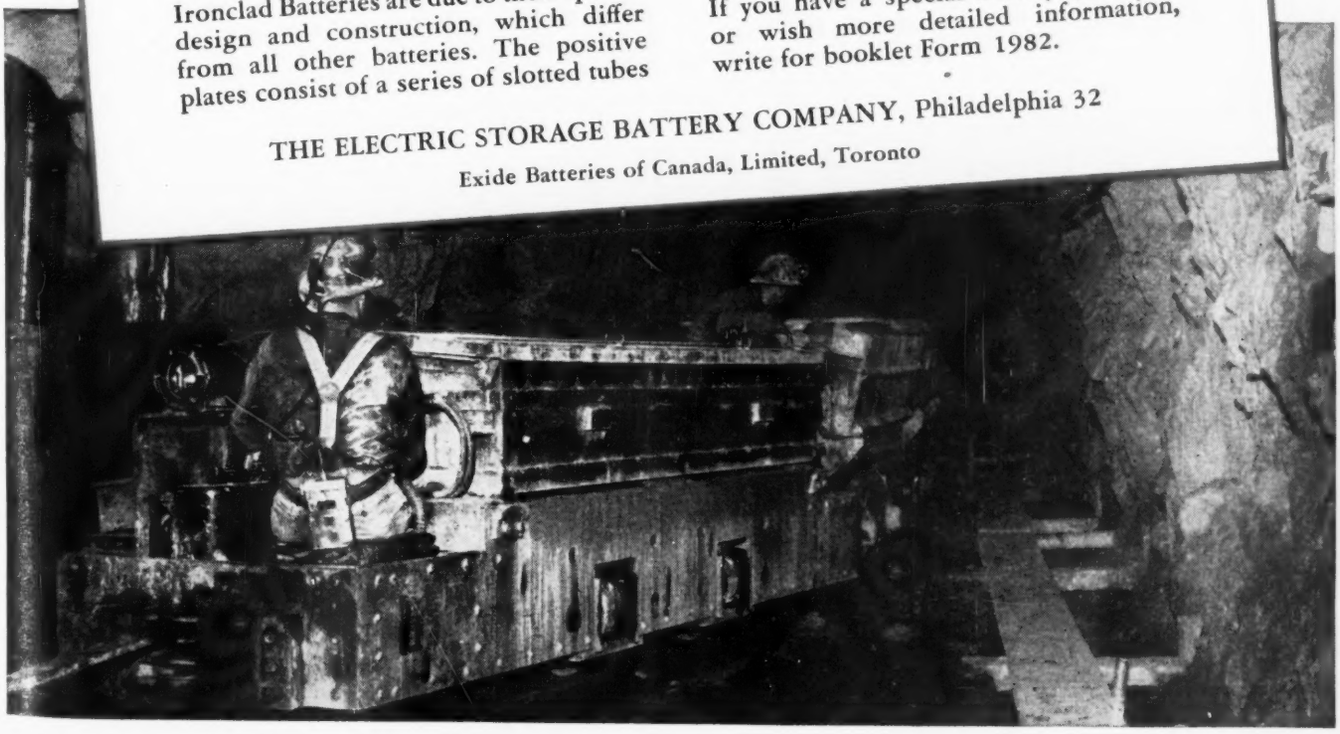

The Foremen's Forum

Efficiency in Coal Shooting; Proper Medium and Methods

WHILE good shooting starts with careful selection of the breaking medium, it is even more important to be sure that the medium—whether powder, air or carbon dioxide—is properly used. Cutting, bugdusting, number and placement of holes and charging are the major factors in usage.

Gouging in the ribs, particularly where bottom cutting is the practice, is one of the major cutting faults contributing to bad shooting. Bars should be sumped in and pulled out as straight as possible, and the bottom should be even without steps or thick spots—not only from the shooting standpoint but to save coal and make subsequent loading easier.

Because, as pointed out in the earlier part of this discussion (September *Coal Age*, p. 102), the additional free face provided by cutting—especially undercutting — materially reduces the energy that must be applied to break the coal and promote safety, the kerf should not be permitted to become blocked. The usual way in which blocking occurs is leaving bugdust under the cut. This, perhaps more than any other one thing, results in tight falls and hard, time-consuming loading, in addition to leading to a tendency to increase the charge in an effort to get a looser more-loadable fall. Increasing the charge naturally raises the per-ton shooting cost. It also penalizes in another way—by increasing the production of dust and smaller sizes, which do not bring as good a price. Good bugdusting of cuts is essential in efficient low-cost shooting.

Drilling Pattern Merits Study

When cutting, bugdusting and the like are taken care of, the foreman comes up against the problem of the number and placement of holes. How holes are placed, which also governs the number to a considerable extent, will largely determine whether the most will be received from the expenditures in labor and breaking medium. The proper number of holes properly placed yields the following benefits: (1) minimum consumption of powder or other breaking energy; (2) maximum production of coarse sizes that sell at higher prices; and (3) maximum ease of loading because of loose, well-rolled-out falls.

Careful study of the problem and considerable experimentation frequently is necessary to arrive at a drilling pattern that will give the best results. Even then the drilling crew must exercise judgment in modifying it to meet special conditions in particular places. With a good basic pattern, however, modification, when necessary, is easier and, meantime, maximum results are obtained in shooting the regular places. As stated, study and experimentation are the keys to the best basic drilling pattern.

The critical factor in drilling is the burden per hole or per charge. This does not mean just the average tons but rather the total resistance per hole or charge, which is a combination of the tons to be moved and the difficulty encountered in breaking it loose. In other words, the same charge in a center shot might bring down 3 tons as against 5 tons in a rib shot. Yet the burden would be equal because the center shot could move only out and down while the rib shot would have an additional free face and could move not only out and down but also toward the center, assuming the center shot was fired first.

Of course, it should not be assumed, as in the example just given, that rib shots always will throw more coal than center ones, or vice versa, since the balance will vary with conditions in various seams and various mines. The essential point to remember is that in determining burden, resistance to being broken loose is just as much a factor as the actual weight of the material.

Within limits, burden per hole (or charge) can be varied rather widely. There is, however, a point at which burden and charge size are in the right relation for best results at lowest cost. For example, it might be attempted to shoot a fairly wide place with three holes, one on each rib and the third in the center, each 6 ft. deep. The distance between holes

How Good Are You on Discipline?

This quiz is designed to help you in your supervisory work. Study the questions and check "Yes" or "No." Then turn to page 110 for explanation.

1. **Do you make sure that your men understand the rules and how to do their jobs safely and efficiently?** ..... **Yes** ☐ **No** ☐
2. **Do you think your men should go ahead and do their work without bothering you with a lot of questions?** ..... **Yes** ☐ **No** ☐
3. **Do you make a point of being friendly and courteous at all times?** ..... **Yes** ☐ **No** ☐
4. **Do you ask a man "Why" before you get on him about something he has done?** ..... **Yes** ☐ **No** ☐
5. **Do you try to get a man when he's with the rest of the gang to call him on his mistakes?** ..... **Yes** ☐ **No** ☐
6. **Do you feel you ought to get a man really well told off when you have to correct him?** ..... **Yes** ☐ **No** ☐
7. **Do you feel it's enough to tell a man that that's the rule and he had better conform or else?** ..... **Yes** ☐ **No** ☐
8. **Do you think there is any need to be prompt about correcting a man or administering discipline?** ..... **Yes** ☐ **No** ☐
9. **Do you think you can handle disciplining men without any outside assistance?** ..... **Yes** ☐ **No** ☐
10. **Do you let some of your men get away with some things others cannot?** ..... **Yes** ☐ **No** ☐

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would be considerable and each would have to pull a lot of coal. To make sure that the holes pulled completely from one to the other and that no coal was left sticking to the top between them, they would be charged up to the limit for permissible explosives—3 lb. each. The pulverizing effect would be materially increased and coal still might be left sticking to the top rather frequently.

If, on the other hand, the burden per hole was reduced by increasing the number from three to four, the distance the holes would have to pull would be reduced, along with the quantity of coal each would have to throw. Instead of 3 lb. per hole, or a total of 9 lb. for three holes, the loading with four might be as follows: each rib hole, 2 lb.; each intermediate hole, 1½ lb. The total for four holes then would be 7 lb., compared to 9 lb. for three. An extra detonator would be required and the shotfirer would have to make an extra trip to connect up, but, in addition to the reduction in powder consumption, the benefits would include less shattering of the coal and fewer brows to be laboriously taken down by hand.

Changes May Save Drilling

Drilling extra holes can, of course, be carried to a ridiculous extreme. But if investigation shows that one or two more per cut will give better results, the pattern naturally should be changed accordingly. It may frequently be found that the additional hole, or holes, can be drilled at no extra cost in time. In the examples just given the three-hole pattern normally would require three drill set-ups if a post drill were employed. On the other hand, by angling the intermediate holes in from the rib set-ups, the four holes in the new pattern might be made with only two set-ups, probably resulting in less drilling time per place.

The slower the breaking medium the more the number of holes usually required. This results primarily from the fact that less energy is applied per hole and it is applied more slowly. With explosives, the speed of action may be slowed down even more by what is known as "cushion shooting." This involves leaving an air space around the charge into which the gas can expand and drop in pressure before it begins acting on the coal.

One method of providing the air space is not to tamp the hole solid to the charge. Since this involves using less than the normal stemming, some operators get the air space by drilling a larger hole. Thus they can tamp solidly to the charge and still get the desired cushioning effect. Good stemming is, of course, essential not only for safety but for shooting efficiency, since it prevents the gases from escaping before they do their work on the coal.

It is a fundamental principle in shooting that each hole, beginning with the first one or the first group, should clear the way for the next. If the first hole or group of holes is placed and shot correctly, the charges in the following holes may be able to move additional coal or, if that is not possible or desirable, can do a better job of bringing it down with less shattering. For many seam conditions the breaking-in or snubbing shot or shots become quite logical, along with the practice of taking some penalty on such shots in the form of more fines to make sure that the following shots can do a better job.

The so-called "breaking-in" shot is used at a number of operations to provide a loose spot where the loader can work into the fall more easily. It usually is charged more heavily to break the coal up and throw it out more. In many cases it permits lightening the charges on the other holes.

Snubbing shots are substantially similar to breaking-in shots, although a distinction sometimes is made in the size of the charge and the fact that the goal in snubbing is more in the direction of relieving the top shots rather than providing an opening into the fall. Snubbing shots begin to come into the picture as seam thickness increases or where partings or bands in the bottom part of the coal must be broken. Since broken coal requires more space than solid, another goal of snubbing is to move at least part of the cut out from under the remainder. Thus the tendency of the loose coal to fill up the available space and offer increased resistance to the movement of the top part of the seam is reduced, enabling the top shots to do a better job with less powder or a lower air or carbon-dioxide pressure.

In the early days of mechanical mining, special equipment and labor were employed at some mines to pull out most of the coal thrown down by the snubbing shots before the top ones were fired. Now, reliance is placed on proper hole placement and charging to kick the lower part of the seam out before the top part is shot. One practice followed by a number of operators is to angle the holes down to the back as steeply as possible, which puts the charge on an incline and tends to increase the kicking action.

•

Handling Discipline

"Yes" should be the answers to Questions 1, 3, 4 and 8, p. 108; "No" to all the others. The reasons, based on principles generally accepted as leading to better discipline, are:

1. One good way of lightening the disciplinary load and making it less necessary to have to correct men is to remove causes for possible misunderstandings and conflicts. If the supervisor takes pains to make sure that the man understands what he and the company expect of him, such misunderstandings and conflicts are materially reduced, and in addition, the worker is more efficient.

2. Elimination of the misunderstandings and conflicts is more than imparting a knowledge of the rules to the worker. Things are constantly coming up about which the worker may feel he needs additional information or guidance. By encouraging men to come to him on such occasions, the supervisor reduces the chances of getting off the track and with it occurrences that might seem to warrant disciplinary action.

3. When the supervisor is on good terms with his men, they are much more anxious to follow his direction and conform to accepted rules and standards. Friendly, courteous treatment is the best road to good feeling. With good feeling, the chances of action requiring discipline are reduced.

4. Flying into a man without giving him a chance to explain can result in injustice and extremely hard feelings. The first rule in administering discipline is to get the man's story and all the surrounding facts. It might turn out that there was a good reason for him acting the way he did. Perhaps he didn't understand. Consequently, he should be given every possible opportunity to present his case. Then—and only then—should discipline be administered—if discipline still is warranted.

5. Never discipline a man in public. It lowers him in the eyes of his fellow workers and is likely to leave him burning for some time afterward. Take the man aside to talk to him.

6. Calmness, reasonableness and firmness are the rules in administering discipline. Getting excited, calling names and yelling merely make the man sore, while the supervisor loses an opportunity to accomplish good for the future.

7. By stating only that a rule is to be obeyed—"or else"—the supervisor is likely to earn a reputation of being hard to get along with. In addition, he loses a real opportunity. In administering discipline, the supervisor has a chance to explain, sell and really win a man over at a time when he is much more likely to take what is said to heart.

8. While it sometimes is necessary to defer administering discipline while an investigation is being made or to discuss the matter with a supervisor, it usually is best to be prompt. Calling a man down a week or so after is likely to lead to a debate as to what happened and to a feeling on the part of the man that he is being picked on.

9. The supervisor who is on his toes should be able to handle the majority of disciplinary cases himself. However, when the circumstances warrant, he should not hesitate to ask for advice. Certainly, he should keep his eyes peeled for hints as to how to handle this particular job better.

10. Fairness is crucial in leading men and administering discipline. If there is favoritism, there is likely to be little or no discipline.

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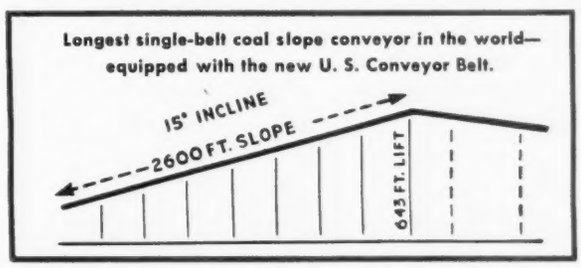

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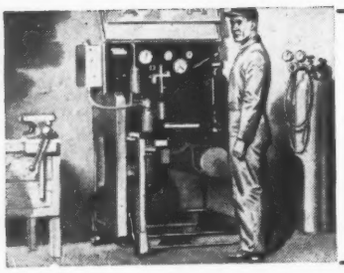
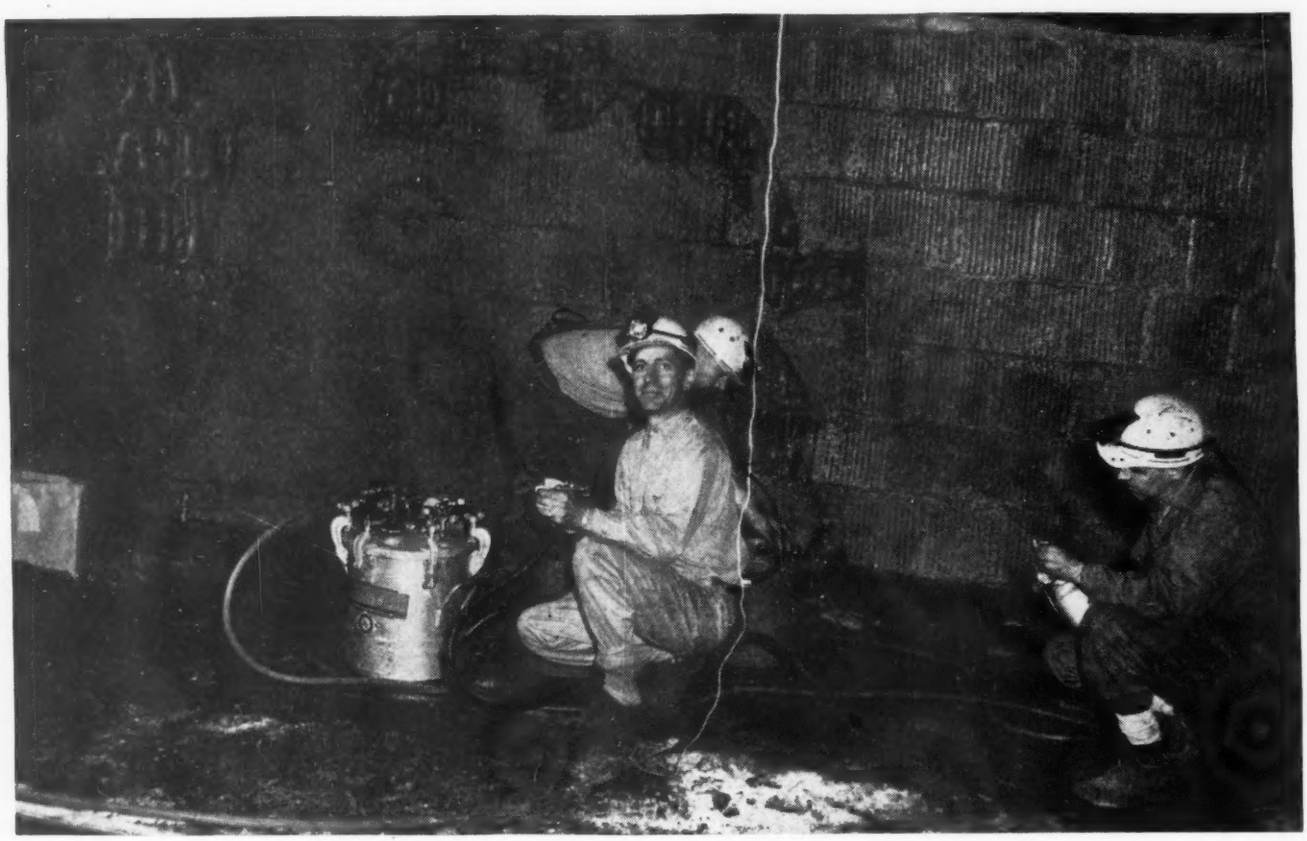


Operating Ideas



STOPPING with the final plastic coat in place ready for the service test.

Stoppings Sealed With Plastic

AN EXPERIMENT to test out the possibilities of a plastic film for making both temporary and permanent stoppings more air tight is being conducted at the Lorado No. 2 mine of The Lorado Coal Mining Co., Lorado, W. Va. The process employed was developed by the Coatings Div., R. M. Hollingshead Corp., Camden, N. J., represented in West Virginia by S-B Protective Coating, Inc., So. Charleston, W. Va.

"The idea of using a plastic film for air-tight brattice work," according to a description of the experiment in the August issue of *The Lorain-Lorado Journal*, "was first developed by Arnold Workman, general superintendent of The Lorado Coal Mining Co., in cooperation with his father, L. F. Workman. So far as is known, plastic film has not previously been used for this purpose.

"Arnold Workman first became interested in the matter when he read in a magazine a description of the 'Cocoon' process for protective packaging of machinery, parts and complete assemblies. The process has been extensively used for wrapping and storing such surplus war materials as B-29's, anti-aircraft guns and vessels of the fleet, as well as machine tools and products.

"After getting in touch with the distributor of the process, Arnold Workman learned enough about the product to believe it might have possibilities in mine work. 'Cocoon' is a film-forming resin carried in volatile solvents so that it can be applied with an ordinary spray gun. It forms a tough and durable film which, though flexible, is both air tight and moisture proof.

"With these characteristics available in a material that can be sprayed easily, it seemed possible that it might be used for brattice work. Arrangements were made with the West Virginia distributor to test the practicability of the 'Cocoon' film under actual mining conditions. Because this was the first known test of the material for mine work, and because its use might promote better safety and ventilation within the mine, the experiment was witnessed by nine members of the West Virginia Department of Mines . . .

"The experiment was carried out on a tile stopping at the mouth of 6 West in Lorado No. 2 mine. This stopping had shown signs of cracking under pressure and therefore was considered a good subject for the test under actual working conditions.

"The plastic film was sprayed on the brattice in two stages, each applied in the same manner but with slightly different materials. For the first coat, the 'Cocoon' solution contained a webbing agent that produced long, cobweb-like filaments which adhered to the stopping. The second

BP means more miles per dollar...

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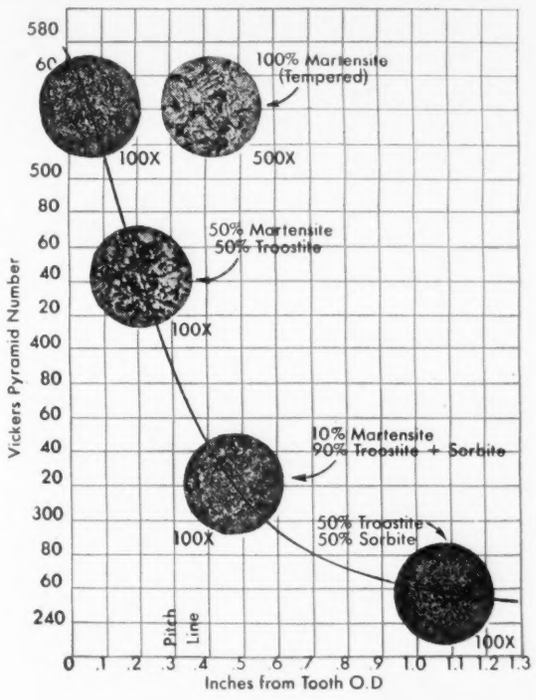
Microphotograph shows why BP heat-treated gears stand up longer, withstand both heavy loads and shock without failing.



* The example is the record of this BP heat-treated gear in transportation service . . . 14 years of continuous operation! And it's ready to go back to work.

This kind of service means money in the bank for any mine operator, because it points the way to more trips per dollar for mine locomotives through use of the exclusive Westinghouse BP heat-treated gears. The chart and microphotographs illustrate why BP heat-treated gears stand up better, longer, are unaffected by both heavy loads and severe shock in mining service.

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coat, of the same material *without* the webbing agent, was applied over the web base to form a uniform film. This film may be built up to any desired thickness by controlling the spraying time.

"If the tests prove successful, the 'Cocoon' film will have decided advantages in brattice and stopping work. It is easier to apply and is not expected to deteriorate as does the burlap now generally used. In addition, it is air and moisture proof and this would result in better ventilation by eliminating the loss of air through the stopping.

"The film formed by the 'Cocoon' process is very flexible and will stretch about three times its own length under pressure without losing its air-tight characteristics. It therefore would have decided advantages for use in permanent air stoppings, which are subject to terrific pressures. These sometimes cause cracks in the stoppings and these interrupt, to some extent, the proper flow of air.

"The flexible 'Cocoon' film would give with these changes in air pressure without cracking or breaking and therefore would prevent waste of air and insure that the air in the ventilating system was being directed as planned.

"Test of the 'Cocoon' film in applications for other purposes indicates that it has a tensile strength of from 1,750 to 2,000 lb. per square inch. It is not attacked by mildew or most molds, and is highly resistant to most chemicals, including salts and acids.

"When subjected to high temperatures, the materials from which the 'Cocoon' film is made will melt but they will not burn or support combustion. The solvents in which the material is dissolved for spraying are inflammable, however, so that care must be taken against fire while spraying. But after these solvent vapors have disappeared, the material is not inflammable, which would be another advantage of the new-type brattice.

"The tests at Lorado have been completed. But only time will tell how well the 'Cocoon' film will stand up under mining conditions. Close attention is being given to the experiment to see if the process is economical and practical, and whether it will receive final approval by the mine inspectors."

White Trays Facilitate Storage in Supply House

CATALOG NUMBERS are stenciled on the front edges of the white steel trays.

BETTER ILLUMINATION, parts all in plain sight, items handier to reach and the whole place easier to keep clean are the advantages of the tray method of storing repair parts and some supplies in a new supply house of the Rail & River Coal Co., at its new service center for Mine No. 3, Bellaire, Ohio.

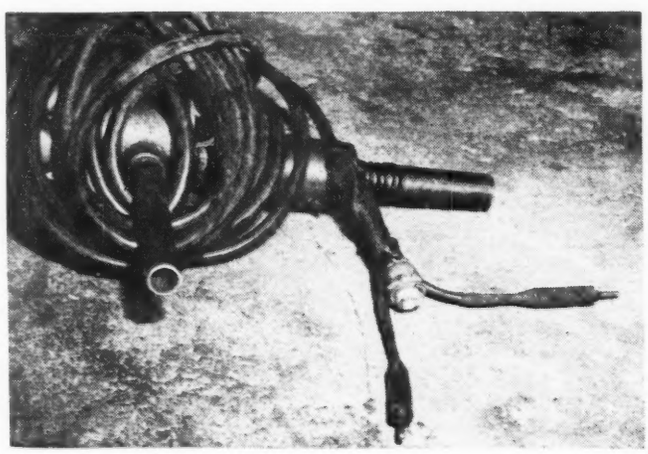
Instead of being partitioned into bins, the material racks are built with shelves. The trays are sheet steel with the front edge turned up 1 in. and the other three edges turned up ½ in. They are enameled white and on the front edge of each tray is stenciled in large numerals the catalog number of the item. A tray can be pulled out if that makes it handier to get items from the back end.

Because of the shortage of steel when the supply house was built, the racks and shelves are made of wood. This tray method was copied from supply houses of the Canadian National Rys., which owns the Rail & River Coal Co.

Plug Fuse Protects Cable and Drill

EXPERIENCE TO DATE at the new No. 11 mine of the Delmont Fuel Co., Summersville, W. Va., indicates that a high-quality weatherproof lamp socket and a standard 10-amp. porcelain screw-type plug fuse afford good protection at very low cost for the 250-volt d.c. hand-held coal drills. As shown in the illustration, the socket is installed near the pair of single-pole Miller plugs and is connected in series with one conductor. This drill is a C-P No. 572.

The mine is a drift operation in the Peerless seam and is being developed with two Joy loaders delivering to chain conveyors, which in turn deliver to belt-conveyor main haulage to the tipple. No gas has been encountered and none is expected in the future. A short in the cable or drill blows the fuse before serious damage is done to either one and the cable is protected from a prolonged arc that would create a dangerous situation.



A LAMPSOCKET with 10-amp. plug fuse installed near the plugs and connected in series with one conductor protects both cable and drill.

Cuts Short Circuits Between Conductors

● Securityflex Parallel Mine Cable with Anti-Short Breaker Strip gives you utmost protection against fire, slow downs, production losses.

This rugged mine cable far exceeds all requirements of the Pennsylvania Flame Test. Specially compounded, heat resisting insulation *plus* flame resisting Neoprene jacket make possible this exceptional protection against cable fires. Special bonding, D-shaped insulation and seine twine webbing give toughness, durability and freedom from kinking.

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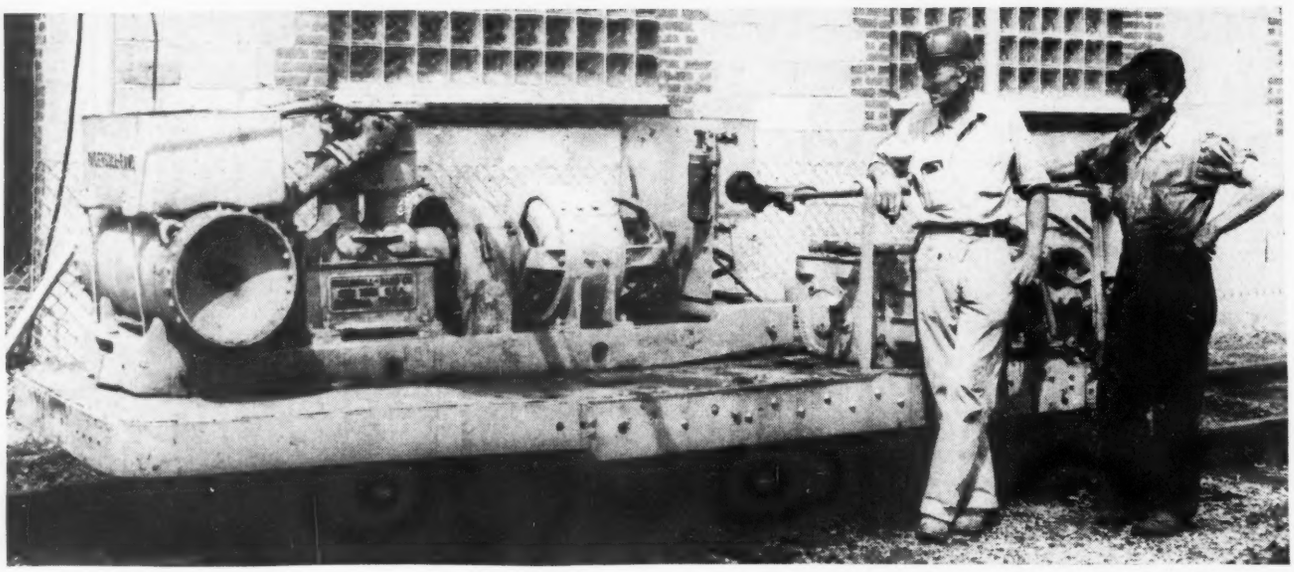


REAL USAGE followed making this air compressor self-propelling, using an obsolete cutting-machine chassis. Messrs. McCoy and Saunders look over their work.

Air Compressor Made Self-Propelling

How MINE NO. 32 of the Consolidation Coal Company (W. Va.) Owings, W. Va., found the solution to the problem of transporting the air compressor to the desired location with the minimum effort is shown in the accompanying illustration. This mobile air compressor was built under the supervision of E. L. ("Si") McCoy, maintenance foreman, and W. A. ("Bill") Saunders, mechanic.

The compressor unit in the illustration was formerly mounted on conventional trucks, as is evident from the holes for the axles in the frame. It was necessary to transport this unit from place to place by some external power, such as a mine locomotive or pushing by hand. Since Mine 32 is scattered over a four- to five-mile area and still is being developed, this transportation was a major problem unless a much-needed locomotive was coupled to it. This procedure was not profitable since all locomotives were required on the haulage.

Mine No. 32 has been modernized recently and since there was on hand an obsolete cutting machine, the turntable was moved and sold for junk, the trucks were removed from the compressor unit, and the compressor unit was mounted on the cutting-machine chassis. The chassis had to be extended 51 in. in front. This was necessary to add weight to the front end for counterbalance. The entire unit is painted a bright traffic yellow to lend conspicuousness and add attractiveness. The cost was negligible as the unit was on hand (but not self-propelled), the machine chassis was not to be used and its turntable was sold for junk. All work on the mobile unit was done between regular jobs as a fill-in.

As can be observed, the trailing cable was not removed, since the unit gets its power through this cable, a tap being made on the leads from the reel. The low gear was removed from the cutting machine since it was no longer necessary. The high gear provides sufficient power and gives the unit a speed of 6 m.p.h. The box mounted in front of the 15-hp. compressor motor is a resistance box for starting. The compressor itself is an old but still very efficient water-cooled unit. The gage registers to a maximum of 200 lb. per square inch but is set to pop off at 60 lb. under present working conditions. The cylindrical air chamber capacity is 4.10 cu. ft., while the water tank atop the air chamber will hold 24 gal.

Prior to making the unit self-propelled, considerable expense was involved in transporting it to the desired location and, in consequence, it was not used very often. Now that it is a mobile unit, it is flexible and is greatly in demand for a multitude of jobs. Some of the jobs such a unit may be called upon to do are:

1. Drilling rock for brushing roof, taking up bottom, digging drainway ditches and constructing sumps.
2. Tamping stone ballast under ties along the main-line haulage.
3. Riveting in the shops.
4. Cleaning underground and outside substations.
5. Blowing coal dust from cutting and loading machines, pumps, locomotives, etc.
6. Spraying paint.

Personnel who have used this unit have remarked that "We wonder how we were able to get along without it prior to making it self-propelled."

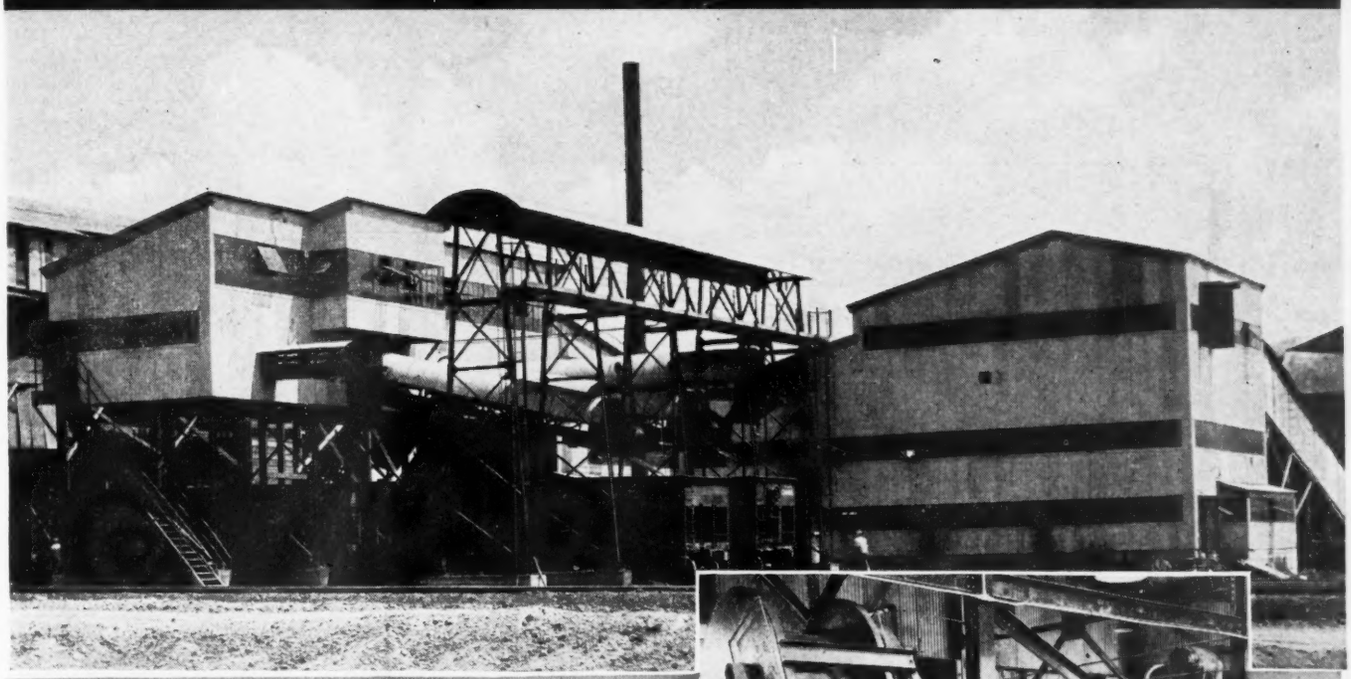
Distortion From Welds Can Be Minimized

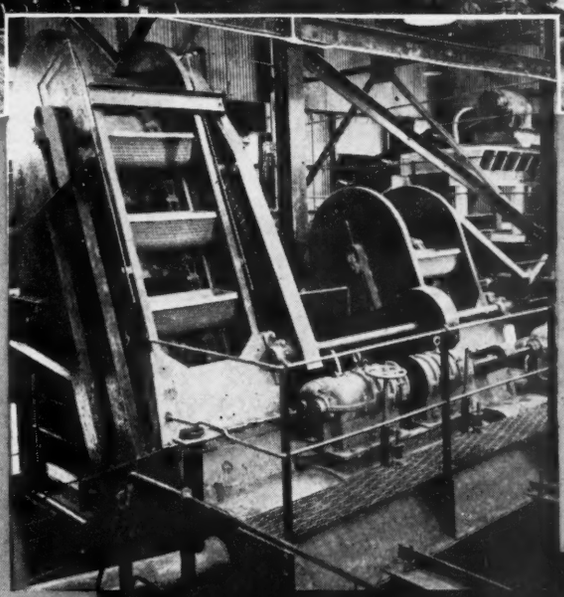
THE DISTORTION in metal when worn surfaces are built up with arc welding, where the amount of weld metal is large in proportion to the parent metal, can be minimized through certain precautions according to the welding engineers of the General Electric Co., Schenectady, N. Y.

If the surface to be built up is not already smooth, it should be ground smooth. Pre-heating to unlock stresses is helpful, if permissible. The electrode size should be small and the current maintained in the mid-range for that electrode to prevent excessive local heating.

The welding beads should be kept thin and should be well peened and only small areas should be covered between peenings. Alternate layers should be laid at right angles. Applying the wire brush between the weld layers with plenty of pressure to the work will help yield sound metal build-up. Adjacent beads should be made to overlap about 40 percent of the bead width.

PREPARE . . . for BETTER PREPARATION





Large view shows the modern coal preparation plant of the Muskingum Coal Company — Misco Mine. The smaller view shows the 2-compartment Baum Jig (Patented) in this Jeffrey-equipped plant.

Jeffrey coal cleaning equipment . . jigs, crushers and companion units . . is designed to produce results, a uniform quality product, high recovery and maximum capacity . . all for the smallest investment and operating dollar.

The operator who satisfies the buyer can benefit, too . . in better profits and wider markets. But his coal cleaning equipment must produce the desired product economically, with practically no loss of coal in the refuse. Take advantage of our industry-wide operating experience and be sure. We will be glad to furnish details.

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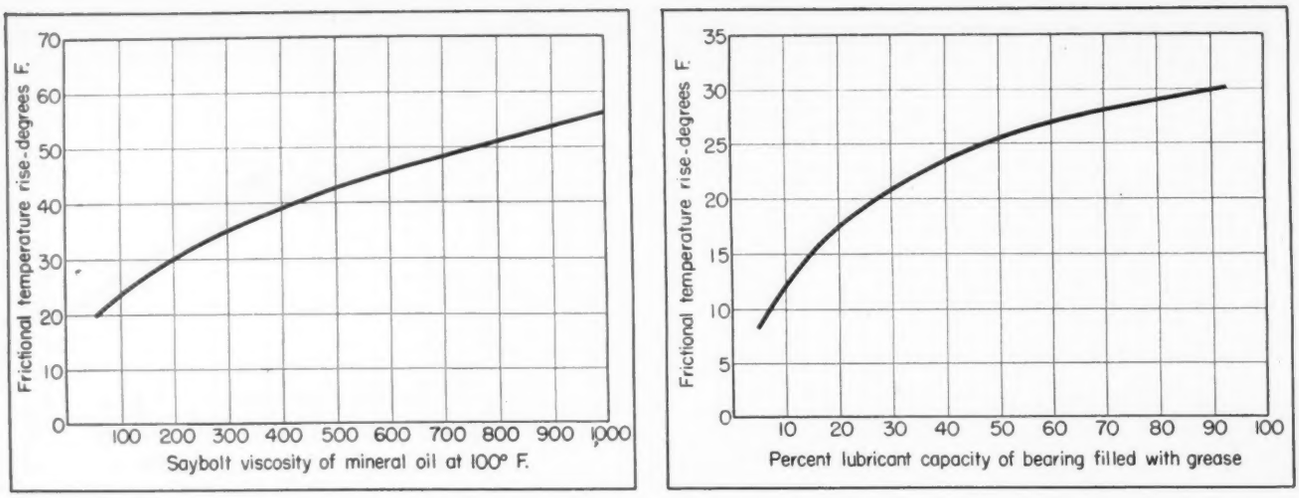

EFFECT OF OIL VISCOSITY (left) and QUANTITY OF GREASE (right) on temperature rise—single-row medium-sized ball bearings operating at 3,600 r.p.m. (left) and 1,800 r.p.m. (right).

Lubricating Roller and Ball Bearings

PLAIN AND ANTI-FRICTION bearings have little in common, either from the anti-friction or lubrication points of view, since there is practically no sliding in the latter, but rather an all rolling action, states P. C. Ziemke, Oak Ridge, Tenn. This eliminates the converging oil film, common to sleeve bearings, and dependence is placed on a wafer-thin absorbed oil film to prevent actual metal-to-metal contact between the balls, rollers and races. The minimum of sliding motion present is between the retainers and the revolving elements.

Note the care with which the new bearing is factory wrapped to exclude moisture as far as possible. This is of prime importance since such things as sweat marks will easily ruin a mirror-finished bearing. Corrosion, while apparently only surface deep, actually is very destructive to bearing life. Any surface mar is but the beginning of ever-deepening fracturing of the bearing metal and hastened failure. There also is the danger of metal flakes becoming detached and lodging in the precision-planned tolerances between ball and race.

When a thorough degreasing job has been completed at overhaul time, use a light stream of compressed air to drive the assembly at moderate speed in the manner of a wind mill. Note that if the bearing has suffered from improper lubrication (one can overlubricate, too), corrosion or excessive loading, one or several balls or rollers will stick and slide in place of rolling. Before charging this to wear, however, check with a compass to determine if the bearing is magnetized. This will cause metal particles to cling in crevices where no amount of degreasing agents will remove them. Use an a.c.-powered demagnetizing coil to correct this condition. Then, sticking of rolling elements can be charged to actual wear. Check this condition with a good magnifying glass to determine whether to insert or scrap the investment.

Some lubricants are inclined to be slightly corrosive and the condition is still further aggravated by moisture and fumes. The better lubricants are not only neutral but also form a protective seal against the infiltration of foreign matter, such as grit, moisture and chemical fumes. Oil, while it has many admirable qualities, lacks this quality of sealing against the above infiltrates and a good grease is recommended. It is timely to note here that many high-quality greases and bearings are ruined by careless storage and application, which permit much destructive dirt to enter. To insure long, dependable service, good lubricants should be treated like good foods. Store them in a clean, cool place, keep the covers on securely and use judiciously.

It definitely is a fallacy to believe that good lubrication may still be improved upon by using more lubricant. A bearing does not require smothering in grease to insure top-notch lubrication. In fact, over-lubrication is as ruinous as having too little, too late. The excess grease results in a churning action that increases friction and power consumption, and the heat generated tends to break the grease down into its components of oil and soap. Grease-gun applications, while desirable when used with reason, have all too often been carried to excess, which results in housing full of a rancid mess, while good housekeeping goes out of the window as fire hazards come in. Maintenance men should know the peculiarities of each drive and the correct quantities and the time intervals at which the gun should be applied.

With new equipment and tightly machined joints, there should be but little occasion to apply renewal grease any oftener than at three-months' intervals for extremely hard service, at six-months' intervals for medium service and at one-year intervals for ordinary service. An excellent practice is to remove the drain plug while the bearing is under load, drain off or clean out this channel and then apply the gun until new grease shows up in the drain. A little patience in permitting any excess to work out before closing the drain will pay handsomely in a trouble-free bearing for many years.

There is no mystery about the selection of the proper grease or oil for the average slow-speed anti-friction bearings typical of most industrial plants, since all that is required is to purchase from a recognized manufacturer or refiner of quality lubricants and apply religiously as prescribed by the builder of the machinery. Space does not permit naming all the information one should have to make wise purchases, yet the information is readily available from any reputable refiner or distributor. Their lubrication engineers also can often help in proper selection.

Care with sleeve-bearing oiling is just as important as with the anti-friction bearings, where any excess will only result in excessive churning and capillary attraction to bearing pedestals and even into the highly engineered motor parts, where oil is ruinous to insulation. Check overflow elbows or sight glasses carefully and maintain the oil level at prescribed levels and no higher. *Caution*: do not add oil while the bearing is under load since, on stopping, the entrained oil will cause the reservoir level to rise and overflow to create a slipping and fire hazard.

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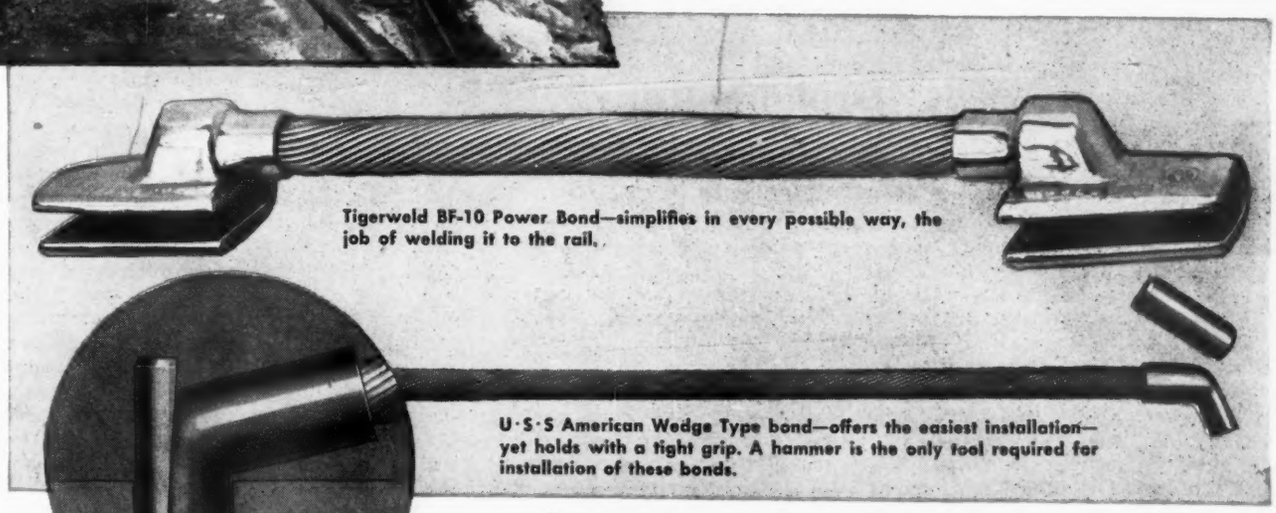
STURDY, U·S·S TIGERWELD Rail Bonds have proved their superiority on hundreds of miles of heavily traveled electrified mine track. They maintain constant low voltage . . . reduce power loss.

Because they have high resistance to vibratory stresses, they assure longer service and keep power flowing year in and year out.

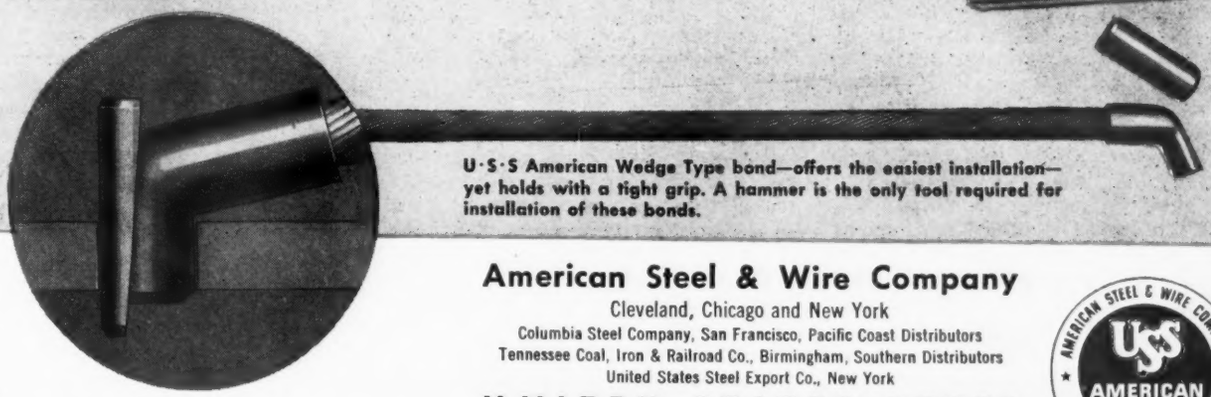
If your requirements are for bonds that permit quick, easy installation, we suggest BF-10 TIGERWELD Rail Bonds. They have a self-clamping feature that holds the bond in correct position for easy welding.

And for temporary or other trackage, where welded bonds are not necessary, the American Wedge Type bond can be installed and removed with a minimum of time and effort.

For complete information on all types of U·S·S TIGERWELD Rail Bonds, contact our sales office most convenient to you.



Tigerweld BF-10 Power Bond—simplifies in every possible way, the job of welding it to the rail.



U·S·S American Wedge Type bond—offers the easiest installation—yet holds with a tight grip. A hammer is the only tool required for installation of these bonds.

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U·S·S American Rail Bonds

Air-Operated Riveting Machine Handles Small Parts

A RIVETING MACHINE for small parts, such as brake drums and clutch plates, puts rivets in and extracts them in the shop of Mine No. 15, Pittsburg & Midway Coal Mining Co., West Mineral, Kan. The machine is manufactured by the Power Brake Parts Co., Detroit, Mich. Adapters are supplied for various sizes and types of rivets. A pedal attachment controls the supply of air to the diaphragm that operates the machine. In the illustration at the left, Ralph Sanders, mechanic, uses the air-powered riveting machine on a clutch disc. After a clean riveting job done quickly and easily, the finished disc (right) is ready to go back to work in the Adams grader.

Training Conveyor Belts

IF CONVEYOR BELTS used for transporting coal underground, up a slope to, or in a tipple, are short and do not travel very fast, not much trouble is experienced in their operation, says Charles E. Chandler, Brownsville, Pa. But where belts are 100 to 3,000 ft. long and travel at speeds up to 650 f.p.m., several factors must be taken into consideration if coal spillage and wear of belt edges are to be prevented.

It goes without saying that the head pulley, tail pulley and drives must be in line and that the top and bottom carriers must be aligned from these pulleys. To align the carriers, once the pulleys and drives are in a direct line, start at the tail pulley and lay off 50-ft. sections with a steel tape on each side. Care must be taken in making this measurement and both sides must be exactly the same, as a difference of ¼-in. will throw the carriers either to the right or left. The carrier spacings then can be laid off between the 50-ft. section marks and permanently marked with a cold chisel. Then, if a carrier is ever moved, it can be recentered on the chisel mark to its original position. A glance at the chisel marks will always indicate whether the carrier is out of alignment.

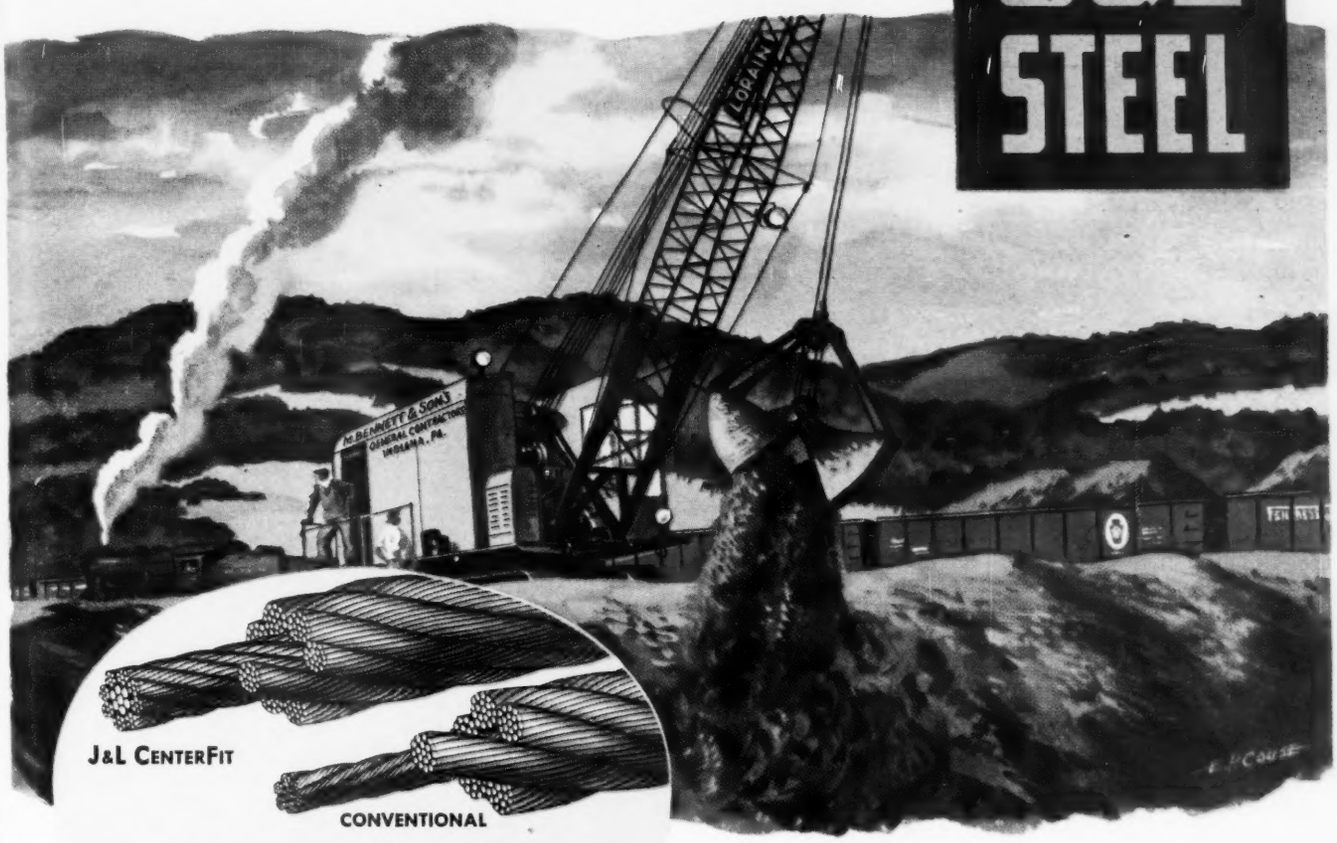
Another cause of belts running off carriers is unlevel decking. Level decking is just as important as carrier alignment, and after a belt has been in service a year or more the decking should be checked. Humps are not so important, but the belt will run off at the point where the decking tends to bulge out from expansion. Many installations still use guide rollers and self-aligning carriers to keep the belt in the trough, but a belt that is always running against the guide rollers will soon have breaks in the edges.

Belt tension also is frequently overlooked when belts are installed. There should be the correct weight on the weight buggy or other tensioning unit to permit the take-up pulley to move as necessary when the load on the belt increases or decreases.

Crooked splices often are the cause of belts wandering off the carriers, and if they are too much out of alignment they must be cut out and remade. A bad splice will affect the belt from 50 to 75 ft. on each side of it. Sometimes, a section of belting from the factory will arrive with wavy places in it, mainly in a long belt with sections of 300 ft. or more. All other sections of the belt will run true, while the crooked section will always run off the carriers. There is not a great deal that can be done with such a piece of belting except, perhaps, to add a little more weight to the tensioning unit and hope that the belt will stretch itself out. Most belts stretch after being put in service, but in coal mines and other damp places some belts, especially the newer type of cord belts, will shrink, and proper allowances should be made when they are installed.

Announcing CENTERFIT—the new all steel Wire Rope that cuts rope costs up to 50%!

J&L STEEL



All 17 strands in CenterFit are laid together in a single closing operation. Note all strands run in the same direction. They fit snugly into valleys between 8 inside strands and eliminate crossing of strands as in conventional design. This prevents internal nicking—gives *longer wear*. Eight outside strands, CenterFit design, give more steel, less void space, mean *greater strength*. More strands give greater flexibility, *easier handling*.

With CENTERFIT 71 contractors get:

- Double the service life on 727 machines
- 20% faster operating speeds
- 25% savings on drum and sheave repairs

CENTERFIT, an exclusive J&L product, is the most outstanding development in wire rope construction since the invention of preforming! Since men first started moving material with cable controlled machines they have sought *stronger, longer lasting, lighter weight* cables to lift *heavier* loads at *faster speeds*. J&L wire rope engineers and production men have now perfected a new rope fabricated for the most costly, toughest "rope eating" jobs in the material handling business . . . closing lines on clamshells, hoisting lines on power shovels, cable controls on wagon scrapers, rooters and other rugged earth-moving equipment. CENTERFIT with its inter-laid multi-strand construction *is the answer!*

The experience of M. Bennett & Sons, general contractors, of Indiana, Pa. is typical of the 71 contractors who have used CENTERFIT. Fred McCauley, J&L wire rope engineer, asked Ira King, Bennett's maintenance engineer, to try "something new" on the troublesome closing line on a 2½ yard clamshell working on a slag unloading job at Blairsville, Pa. On this job, the best conventional wire ropes averaged only 4 days service—7 days at the most. J&L CENTERFIT rope after a full week was operating perfectly with little sign of wear. Two weeks, three weeks passed—finally, after *four weeks* the rope was taken out of service. The performance was *four times better* than anything King or Bennett had ever seen! They naturally ordered more CENTERFIT and soon had it working on 15 other pieces of equipment. Bennett's skilled operators found that CENTERFIT does not backlash and snarl on overruns, making possible 20% faster operation by eliminating drum-locking, kinks and "birdcages."

The special construction of CENTERFIT provides a greater distribution of stress and wear, gives longer rope service life and up to 25% savings on sheave and drum maintenance. J&L CENTERFIT *costs no more than ordinary wire rope*. Your local J&L distributor or J&L warehouse is now stocked with most sizes of this new money saving rope. Descriptive literature giving complete technical information about CENTERFIT will be sent you on request. Write Wire Rope Department, Room 911, Jones & Laughlin Bldg., Pittsburgh 30, Pennsylvania.

JONES & LAUGHLIN STEEL CORPORATION

Trouble takes a trip – via rubber elevator

The hose you see above is lifting "trouble" out of a coal mine.

It's being used to siphon off seepage water that collects in mines and causes costly slow-downs.

This job calls for more than just "any hose." It takes a hose that's specially designed, specially constructed for heavy-duty water suction service.

Monarch Water Suction Hose is that kind of hose. It's built by Hewitt Rubber to "take it" and come back for more—even under conditions of constant exposure to corrosion and abrasion.

Its smooth, internal fluidway virtually eliminates frictional resistance . . . assures fast water-flow. Its thick tube is especially compounded to withstand the scouring action of muds and other abrasive materials.

A reinforcing spiral of spring-steel wire is embedded in the hose carcass to prevent collapse under heavy suction . . . and assure flexibility. A tough, abrasion-resistant cover provides full protection for the hose . . . assures long-lasting service in water suction operations.

So why not use Monarch Water Suction Hose for your drainage operations? You'll agree it's the right hose for more efficient, more economical service. For details, phone the Hewitt distributor listed in the classified section of your phone directory. Or write to Hewitt Rubber Division, 240 Kensington Avenue, Buffalo 5, N. Y.

You can depend on your industrial supply specialist

He's always ready to serve you. And he knows your job . . . your operations . . . your problems. Call on him at any time for advice. He'll recommend the exact Hewitt product especially designed to help *improve* the efficiency of your operations.

HEWITT-ROBINS INCORPORATED

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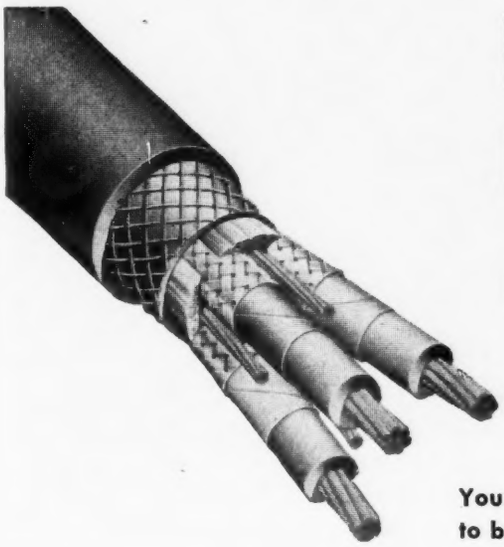
INDUSTRIAL HOSE • BELTING • PACKING

Monarch Water Suction Hose



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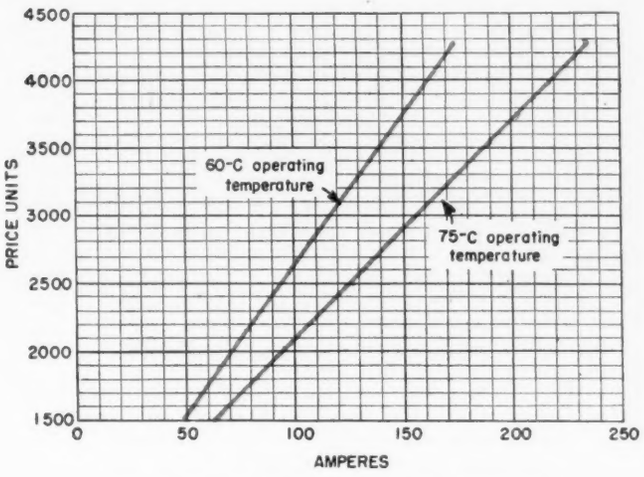
You get greater value per dollar with Geoprene Portable cable. It costs less to buy, and what's more, it lasts longer. Here are the facts:

GEOPRENE PORTABLE costs less to buy



High-temperature insulation raises current-carrying capacity, permits use of lower-cost, smaller-size cable.

As shown on the graph, which is based on 5000-volt SH-D cables, average savings in first cost are about 19 per cent, based on the smaller cable size which can now be employed on any given job. Current-carrying capacity has been increased appreciably by use of insulation approved for 75-C operation, instead of the 60-C insulation normally used, with no increase in cost.

On larger cables this saving is particularly important, not only in first cost, but in greater handling ease due to the decreased weight and bulk. For example, a shovel previously requiring a 4/0-awg conductor size can now be served by a 2/0-awg cable.

GEOPRENE PORTABLE costs less to maintain

Most critical factor in portable-cable life is the abuse-resistance of its jacket. And Geoprene* hits a new high in strength and chemical stability. In standard tests *its tear strength is two and one-half times as high as Tellurium,* our famous prewar natural rubber jacket. This remarkable resistance to cutting action and abrasion boosts the life and safety of Geoprene Portable well beyond that of an ordinary portable cable. In addition, Geoprene exhibits 105 per cent better aging properties than required by industry specs., and carries Pennsylvania Dept. of Mines Approval P-108 for flame resistance.

When the facts are combined, Geoprene Portable with its 75-C operating temperature offers a double value compared to cables with rubber jackets and 60-C insulations. And it's less bulky, lighter weight, and easier to handle.

May we suggest that you remember this longer life at a lower price the next time you need portable cable. For details, call your G-E representative or write for bulletin GEA-4229. *Apparatus Dept., General Electric Co., Schenectady 5, N. Y.*

*Geoprene—special G-E compound containing approximately 60 per cent neoprene, with the balance consisting of plasticizers, accelerators, and reinforcing agents.

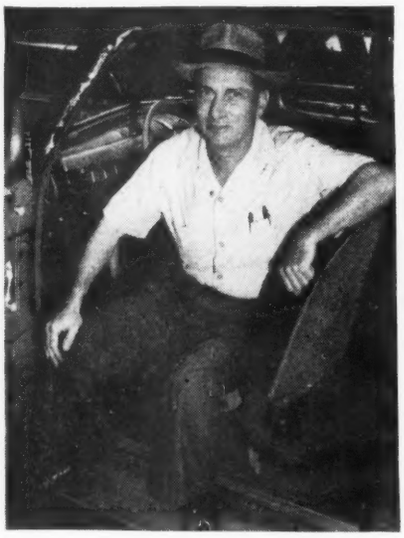
GENERAL ELECTRIC

COAL MEN

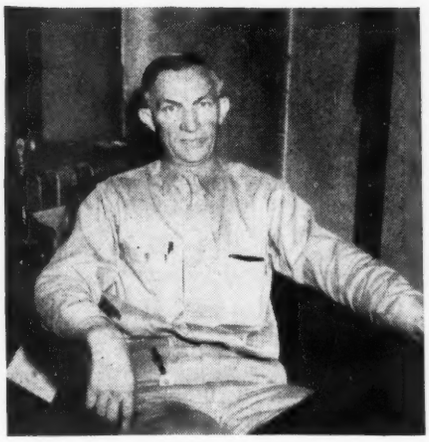
J. B. Kennedy (left), tipple foreman, Burke Johnson, superintendent, and M. V. Crigger, chief electrician, Leckie Collieries Co., Aflex, Ky.

C. H. Schlapp Jr., president, Perry Coal Co., St. Louis, Mo.

William W. Bolt, general superintendent, St. Ellen mine, Perry Coal Co., O'Fallon, Ill.



F. L. Apple, resident manager, Ford Motor Co. properties, Stone, Ky.



T. H. Booth, chief engineer, Eastern Coal Corp., Stone, Ky.

James Cassano (left), assistant general superintendent, Utah Fuel Co., with W. B. Odendahl (seated), superintendent, Sunnyside mine, and A. W. Dodds, coke-oven superintendent.

Darel Sworts, safety engineer, Sunnyside mine, Utah Fuel Co., Sunnyside, Utah.

H. P. Beal, superintendent, Pioneer No. 3 mine, Pioneer Coal Co., Walker, Mo.

T. W. Timberman (left), chief engineer, and O. W. Evans, general superintendent, Mining Department, Norfolk & Western Ry., Williamson, W. Va.

ON THE JOB

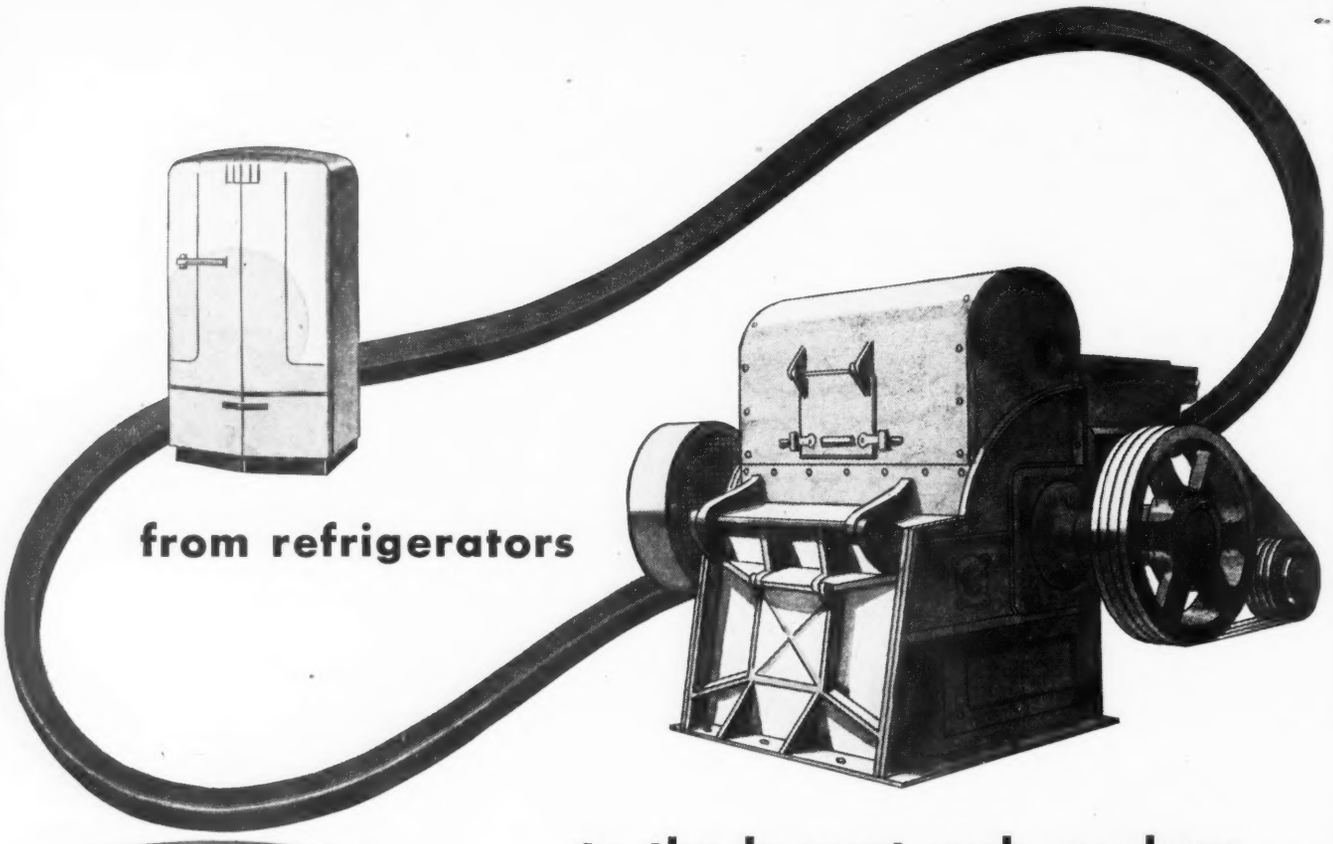
Carl F. Stewart, personnel director, Castle Shannon Coal Corp., Coverdale, Pa.

Fred Bowen, general superintendent, New Castle mine, Windsor Coal Co., Windsor, Mo.

A. R. Coble, assistant general superintendent, New Castle mine, Windsor Coal Co., Windsor, Mo.

F. E. Perkins, general superintendent, Pioneer No. 3 mine, Pioneer Coal Co., Walker, Mo.

E. S. Hamilton (left), superintendent, and Stephen Younger, safety director, Pond Creek colliery, Mining Department, Norfolk & Western Ry., Williamson, W. Va.



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Power transmission engineers know the many advantages of V-Belt drives . . . compact, noiseless, positive, economical, etc. Experience has proven that additional advantages are derived —at no increase in cost—when Thermoid V-Belts are on the job.

Great strength, long life and uniformity are all built into Thermoid F.H.P. (Fractional Horsepower) and Multiple V-Belts, because every belt—from raw materials to finished product—is manufactured under the most exacting controls.

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It's Good Business To Do Business With Thermoid

News Round-Up

Jones & Laughlin, National Steel Plan Large-Scale Developments

● A large-scale development program calling for the consolidation of its Vesta Nos. 4 & 5 mines and the construction at the No. 5 mine of a new washing plant capable of handling 26,000 tons of material daily, was announced last month by the Jones & Laughlin Steel Corp., Pittsburgh. Mechanization of the two mines has been going on for some time and is now about effected, according to the company, and when the proposed new program is completed in 18 months to two years the consolidated mine will be equipped to produce 18,000 tons of washed coal daily.

Under the proposed system of mining for the new mine, the full seam, consisting of 5 to 6 ft. of coal topped by 12 to 18 in. of slate, will be loaded into mine cars. The refuse to be removed by the washery before the coal is shipped via the Monongahela River to the company's mills at Pittsburgh and Aliquippa is expected to total 8,000 tons daily. All coal from the consolidated mines will be brought to the surface through the portal of Mine No. 5 and part of the new program calls for construction of underground haulageways between the two mines and the installation of car-dumping and handling equipment. Present 4-ton mine cars are to be replaced with new 9-ton steel cars. The new washer is to be located on the east bank of the river opposite the portal, and construction of a new bridge across the river, as well as new barge harbor, loading facilities, etc., is planned. For equipment details of the new plant which, according to the company, will be the finest installation of its kind in the world on completion, see page 166 of this issue.

Sale of company-owned miners' homes in the two modern towns serving the mines also has been announced by Jones & Laughlin. To date, all the houses at Richeyville and over half the houses at Vestaburg have been sold to employees.

● Plans for the opening of a new completely mechanized mine with an ultimate capacity of 1,500,000 tons yearly, near Morgantown, W. Va., were announced Sept. 8 by the National Steel Corp., Pittsburgh. The operation, to be known as the Weirton mine, is to be located on a tract of more than 10,000 acres of coal land in Monongalia County and will be devoted exclusively to the production of metallurgical coal for the Weirton Steel Co., a division of National Steel.

Preliminary work on the property is reportedly now under way and opening of the main entries of the mine and construction of the surface plant is expected to begin within a year, with operation of the mine planned by 1950. Estimated cost of buildings and equipment exceeds $5,000,000. An initial working force of 500 men and a production of 1,000,000 tons yearly is anticipated, with 750 men employed when full production of 1,500,000 tons yearly is reached.

Surface installations will include a modern office building, a cleaning plant, warehouse, shops, bath house and river docks. The cleaning plant will be equipped with a jig-type washer with a capacity of 400 t.p.h. and facilities for blending, sizing and drying. Coal will be transported from the cleaning plant to river docks through a two-mile tunnel on a belt conveyor utilizing a single belt for the entire distance, said to be the longest single belt yet to be installed. The tunnel, which will be 7 ft. high by 14 ft. wide, will also have an auxiliary track.

Full operation of the mine at its potential capacity cannot be expected, the company stated, until channel and lock improvements in the Monongahela River are made. Until that time, barges will be half-loaded at the Weirton mine and then taken for full loading to the company's Isabella mine. The coal to be mined by the new operation is in the Upper Freeport seam and is high-grade metallurgical quality.

● A new two-mine operation expected to produce 1,500,000 tons of coal annually is reportedly being developed by the Snow Hill Coal Corp. seven miles northwest of Terra Haute, Ind., at a cost of $2,500,000. The mines are to be known as the Green Valley, in the No. 3 seam, and the Wabash, in the No. 5 seam, and are to use the same shaft. Initial production is planned for next April and 480 miners will be employed.

The project is said to include construction of an $850,000 washing and preparation plant and a 43-acre lake to supply washing water. The Pennsylvania R. R. has built a spur line from Liggett, Ind., to the mine site, at a cost of $500,000.

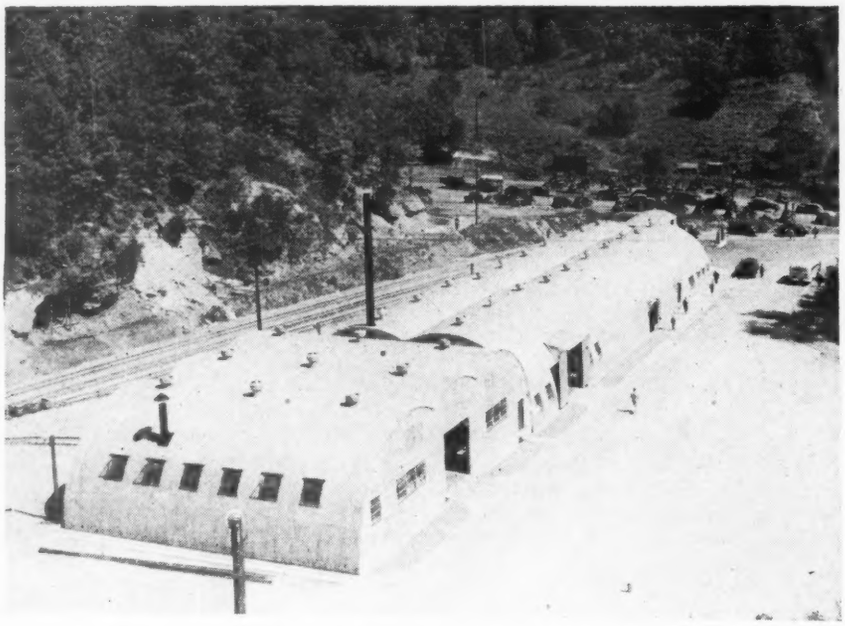
● Development of the new Viking mine seven miles north of Terra Haute, Ind., by Walter Bledsoe & Co., is reportedly under way. It is understood that the operation will provide 500,000 tons yearly to a new generating plant to be built near the mine by the Public Service Co. of Indiana.

● A new mining operation expected to involve expenditures of $1,500,000 is reportedly being opened by the Truax-Traer Coal Co., Chicago, at Dorothy, W. Va., on Clear Fork. The mine will have an ultimate capacity of 4,000 tons daily and will employ 350 men, it is said. The company also was reported as expecting to open later two other seams located on the opposite side of Clear Fork from the present mine. Construction of Truax-Traer's new coal preparation plant at Ceredo, W. Va., estimated to cost $2,000,000 or more, was expected to begin Sept. 22, with the announcement of contracts awarded to the Huntington (W. Va.) Excavating Co. for construction of a 2,000-ft. earthern levee extension of the Ceredo flood wall and cement structural work for the plant. Work on these projects is expected to require nearly 18 months for completion, on a 24-hour-a-day schedule.

● Production of coal from the properties of the new Nassau Coal Co. is slated for the first of the year, according to a recent statement by Roland C. Luther, president of the firm. The new operation will be located at Black Wolf (W. Va.) on the Tug Fork branch of the Norfolk & Western R. R. and mine the Pocahontas Nos. 3 & 4 seams. The present production goal will be 1,200 tons daily, with an increase in output planned as quickly as possible after that is attained.

The company is reported to have purchased all the coal acreage of the old Black Wolf Coal Co. and to have leased considerable land from the Pocahontas Land Corp. and the U. S. Coal & Coke Co., for a total of 1,500 acres available for development. Run-of-mine from the No. 3 seam will be mined first, but coal-preparation facilities are expected to be later installed.

● The first of three new mines being opened in Illinois by the Peabody Coal



Modern Buildings for New Consol (Ky.) Portal

A VIEW of the administration building recently completed at the new Marshall Branch portal, Mine No. 204, Consolidation Coal Co. (Ky.), six miles from the old portal at Jenkins. Built of "Quonset" construction, with a considerable saving in time and money, the building contains offices in the far end, bathhouse in the middle part and a supply house and shop in the three-arch section in the foreground. Beyond the building, Champion Stores, Inc., has a store and grill of similar construction. No expense has been spared, according to the company, in making the entire installation as attractive and efficient as possible, both inside and out. A substation of the same construction also has been erected nearby.

Co. was scheduled to begin actual production in Mid-September, according to an announcement earlier in the month. The new slope operation, located in Saline County near Harrisburg, will have a capacity of 2,500 tons per shift but is expected to operate only one shift a day for the present. The company is understood to have issued invitations to bid on the sinking of shafts for the other two mines now planned, one of which will be located at Pana, and the other 15 miles west of Taylorville. The Peabody company was recently authorized by stockholders to issue up to $20,000,000 of mortgage bonds to finance the proposed expansion.

● A new man-shaft designed to materially reduce underground travel time was opened early in September at the New Orient mine of the Chicago, Wilmington & Franklin Coal Co., West Frankfort, Ill. The new facilities, which are located four miles from the hoisting shaft, have been under construction for about a year and include a new washhouse reported to accommodate 1,000 men.

● Substantial production from the new Mine No. 3 being developed at Zeigler, Ill., by the Bell & Zoller Coal & Mining Co., is not expected for about a year, according to a recent statement by company officials. Two slopes for the mine are being sunk at the present time, one for a belt and manway and another for air and materials.

● The Logan Gap Coal Co. has reportedly been organized at Whitesburg, Ky., by Sam Bates, Robert Collins and others, to develop several thousand acres of coal lands in the Rockhouse Creek area of Letcher County. Sizeable truck mines are expected to begin operation shortly, with the coal being trucked to a Whitesburg loading ramp on the L. & N. R. R., pending the completion of the Rockhouse Creek branch of the L. & N. R. R. (*Coal Age*, July, p. 126). Initial production by the new company is to be 500 to 600 tons daily, it is understood.

● The stripping firm of McGee & Walker, McMinnville, Tenn., who have been mining 300 tons daily from a 2,000-acre tract of mountain land in Sequatchie County, is reportedly planning to step up operation to 700 tons daily. The coal is at present being trucked to Daus, Tenn., for loading on the N. C. & St. L. Ry., but it is understood that loading at Rowland Station also will begin very soon. The output of the operation is being sold to the Capitol Coal Sales Co., Chattanooga, and Roy Walker is in charge of mining operations.

● Opening of a new shaft mine near Marion, Ill., by the MacWeir Coal Corp., Chicago, has recently been reported. The company, which is said to have acquired 6,000,000 tons of underground coal, is headed by Paul Weir and George McFadden. The shaft will reportedly be located south of Route 13 on the road that led to the old Delta strip mine.

● The Piney Fork No. 1 mine of the Jefferson Coal Co., largest underground producer in the State of Ohio in 1946 with a total tonnage of 1,020,894, was expected to increase its production by one-third shortly after an aerial tramway being built to open an additional tract of coal begins operation this fall. The Piney Fork preparation plant is also being expanded to prepare ¼-in. coal and smaller.

● Canadian Collieries Ltd. (Dunsmuir) is reportedly completing plans to begin full-scale production at its new mine at Tsable River that is expected to double coal production from Vancouver Island. Exploration of the 12-ft. Tsable River seam indicated coal reserves available for mining of 1,000 tons daily for the next 30 years, and its development is regarded as the most important coal-mining development in the area for many years. Initial work at the property began early in 1945 but has been held up because of postwar shortages of labor

Business and Industrial Activity

		1947 to This Date	1947 Over 1946 to Date
Est. anthracite prod., August, 1947, net tons	4,994,000	36,877,000	— 7.9%
Est. bituminous prod., wk. end. Sept. 20, 1947	12,235,000	437,893,000	+ 15.8%
Sales, domestic stokers, July, 1947	6,637	30,874	— 70.4%
Sales, domestic oil burners, July, 1947	91,017	598,057	+195.8%

	Week End. Sept. 20	Month Ago	Year Ago
Business Week Index of Business Activity	183.1	183.7	181.9
Steel ingot operations (% of capacity)	94.1	93.4	90.4
Electric power output (million kw.-hr.)	4,977	4,953	4,507
Crude oil prod. (daily avg., 1,000 bbl.)	5,200	5,153	4,775
Misc. & L.C.L. carloadings (daily avg., 1,000 cars)	88	85	86
All other carloadings (daily avg., 1,000 cars)	66	66	66
Prices, spot commodity index (Moody's, Dec. 31, 1931 = 100)	429.0	419.7	335.2
Prices, industrial raw materials (B.L.S., Aug., 1939 = 100)	272.0	266.2	205.6
Prices, domestic farm products (B.L.S., Aug., 1939 = 100)	380.4	375.2	292.2
Prices, finished steel composite (*Steel*, ton)	$75.41	$75.41	$64.45
90 stocks, price index (Standard & Poor's Corp.)	119.8	121.7	116.2

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Ohio's "15 Most Promising Young Miners"

HIGHLIGHTING the annual Ohio Miners' Safety and Accident Prevention Meet at Dillonvale on Aug. 17, these 15 young miners, singled out to represent an enthusiastic and progressive coal industry, were dubbed Ohio's "Most Promising Young Miners" and, dressed in black bow ties and tuxedos, were paraded before thousands of miners and their families who crowded into the Dillonvale High School stadium. All 15 men are high school graduates and several of them have college education as well. In the picture above: Top row, left to right —George Kanopsic, Hanna Coal Co.; Herman Perzanowski Jr., Cambria Coal Co.; Edward Requilez, Lorain Coal & Dock Co.; Roy Richardson, Powhatan Mining Co.; George Brkich, Powhatan Mining Co. Middle row—Charles Young, Midvale Coal Co.; Joseph Kolanski, Monoco Coal Co.; John Kochan, Warner Collieries Co.; Brinley Allen, Hanna Coal Co.; Walter Goga, David Z. Norton Co. Bottom row—Paul Fillipovich, Youghiogheny & Ohio Coal Co.; Steve Torok, Youghiogheny & Ohio Coal Co.; James O'Grady, Rail & River Coal Co.; Louis Murie, Hanna Coal Co.; Alfred Knight, Warner Collieries Co.

and equipment. Total production from all mines on Vancouver Island was 36,436 tons in July, 1947.

● Purchase from the Bower Mine, Inc., of a Braxton County strip-mine property and lease of property believed to contain about 10,000,000 tons of coal, by the Cain Coal Co., Wolf Summit, W. Va., was announced last month.

● The McCartney Coal Co., Morgantown, W. Va., is reported to be planning to open a new mine producing 200,000 tons of coal yearly in Dunkard and Monongahela Townships, near Mt. Morris, W. Va.

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Ohio Safety Meet Draws Large Crowd

Before a crowd of some thousands, Team No. 1 of the Midvale Coal Co., with a score of 99.60, took top place in the Third Annual Ohio Miners' Safety and Accident Prevention Meet, held at Dillonvale, Ohio, Aug. 17. The all-day program included talks by union and operator heads, state and federal mine officials and others. The 15 "Most Promising Miners" selected by Columnist "Hi Waters" McWilliams were introduced to the crowd and interviewed over a radio hookup.

Standing of the teams was as follows: Midvale No. 1, 99.60; Piney Fork No. 2, Jefferson Coal Co., 99.50; Wheeling Township Coal Mining Co., 99.25; Dun Glen, Hanna Coal Co., 99.20; Rail & River Coal Co., 99.00; Piney Fork No. 1, 98.95; Nelms, Youghiogheny & Ohio Coal Co., 98.90; Camel Run, Warner Collieries Co., 98.80; Florence, Y. & O., 98.60; Wolf Run, Warner Collieries Co., 98.50; Willow Grove, Hanna Coal Co., 98.10; Midvale No. 2, 97.80; and Dillonvale Miners, 97.50.

•

Union, Operators Begin Anthracite Output Drive

A combined industry-union campaign to step up production of anthracite to meet the forthcoming winter fuel shortage and strengthen the industry's economic position was discussed in Washington in Mid-September at the first meeting of the operator-union Committee of Twelve held since signing of the new anthracit wage agreement.

As the first step, a letter to be mailed to the homes of its 73,000 members was issued Sept. 22 from U.M.W.A. headquarters. Signed by John L. Lewis, John O'Leary and Thomas Kennedy, and by the three district presidents, it pointed out that the predicted winter fuel shortage is a challenge to the industry and that greater production is clearly indicated in everyone's interests. "Increased daily production can be brought about by individual and collective cooperation between the operators and the mine workers," the letter stated, and asked that "each examine his own conscience in the light of the facts and act accordingly." A "generous response" to Saturday work, where available, also was urged.

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Personal Notes

William F. Wolfe, formerly general manager and superintendent for the Warner Collieries Co. mines in West Virginia, has been named a vice president of the company and general manager of its operations in that state. **Edward B. Hall** has been appointed personnel manager and **Leonard Brooks** has been made superintendent, Hurricane No. 106 mine, Mammoth, W. Va.

A change in ownership and the election of new officers for The Black Diamond Fuel Co., Boulder, Colo., were recently announced. The new officers include: **Frank Yakes,** Denver, president; **Charles Liley,** Denver, vice president; **William Liley,** secretary-treasurer; and **Everett Billington,** Lafayette, assistant secretary-treasurer and general superintendent.

Edward H. Greenwald, formerly mining engineer, Boone County Coal Corp., Sharples, W. Va., has been named assistant to the general manager of the company.

Dr. Louis C. McCabe, chief, coal division, U. S. Bureau of Mines, has resigned to accept an appointment as administrator of the new anti-smog law in Los Angeles County that became effective Oct. 2. Dr. McCabe, who during the war served in Europe as a colonel in the army and was active in the operation of European coal mines, joined the Bureau on retiring from the army a year ago. He was at one time associated with the Illinois Geological Survey.

Dan H. Wheeler, formerly director, Bituminous Coal Division, U. S. Dept. of Interior, has been named assistant director of a new program division of the Department, which will assist in coordinating the programs of its various bureaus and divisions and in forming policies and objectives.

Julian W. Feiss, editor, *Mining Congress Journal,* has been appointed to the newly created post of assistant to the director of the U. S. Bureau of Mines. Mr. Feiss, who has a broad

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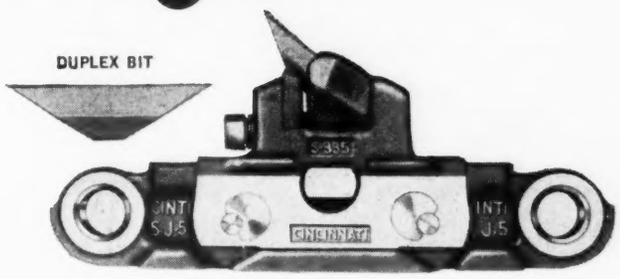

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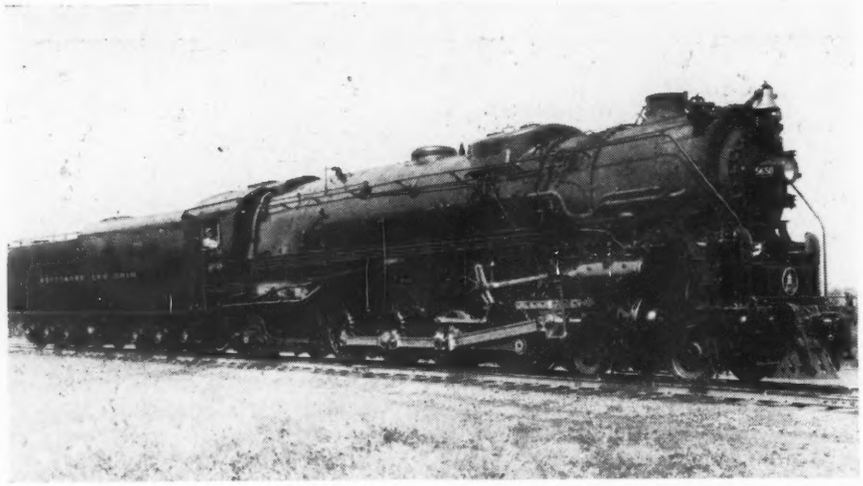

Steam Locomotives Change Hands

TWENTY-THREE mountain-type steam locomotives recently have been acquired by the Baltimore & Ohio R.R. for high-speed freight service. The locomotive shown is one of 13 bought from the Boston & Maine R.R. for use on the B. & O. between Chicago and Newcastle, Pa. Ten Mallet steamers also were purchased from the Seaboard Airline Ry. for service between Cumberland and Brunswick, Md.

experience in the mining industry, is expected to give special attention to the long-range programs of the Bureau.

Ed Claiborne has been named superintendent, Block mine, Diamond Coal Mining Co., Block, Tenn.

C. J. Barton has been made assistant general superintendent for the New Jellico Coal Co., Morley, Tenn.

L. R. Jackson, who supervised several operations for the British during the war, has been made stripping superintendent for the Debardeleben Coal Corp., Sipsey, Ala.

H. J. Hager, formerly superintendent, Praco mine, Alabama By-Products Corp., has been promoted to assistant general superintendent of the company's operations, with offices in Birmingham. He was succeeded at the Praco mine by **R. T. Hill,** previously superintendent of the company's Barney mine at Cordova. Superintendent at the Barney mine now is **W. E. Self,** formerly safety manager for the company.

George R. Armstrong has resigned as chief engineer of the Sloss-Sheffield Steel & Iron Co., Birmingham, Ala., to become vice president in charge of operations of the Etowah Coal & Iron Co., Gadsden, Ala., and the Coosa Coal Co., Wattsville, Ala. **Leonard Hammett** is in charge of coal mining operations at the Wattsville operation.

Col. Robert Keonig, president, Ayrshire Collieries Co., Indianapolis, was named by Secretary of Commerce Harriman earlier this summer, chairman of the mineral resources subcommittee of a "nonpartisan committee of distinguished citizens" formed to study the ability of the United States to meet demands for export goods to assist in implementing the Marshall plan for Europe. A report was to be submitted by the committee by Oct. 1.

V. A. Hensley, superintendent, Midvale mine, Coal Division, Eastern Gas & Fuel Associates, Gamoca, W. Va., has been named superintendent of the company's Weeksbury (Ky.) mine, succeeding **H. S. McKalip,** who is retiring after more than 20 years' association with the company. **Myron Kok,** of the Powellton, W. Va., operating department, succeeds Mr. Hensley as superintendent at Midvale.

H. Carl Mercer, mine foreman, Mine No. 204, Consolidation Coal Co. (Ky.), has been appointed superintendent of the company's Clover Splint mine, Closplint, Ky., replacing **E. F. Wright Jr.,** who resigned to join the Clinchfield Coal Corp. as general manager of its newly developed mines in Virginia. **Ed Boggs,** formerly section foreman at Mine No. 204, has been promoted to mine foreman, succeeding Mr. Mercer. **Albert Haynes** has been promoted to superintendent of Consol's new Hill mine in Pike County, Kentucky. At Mine No. 155, Van Lear, Ky., **Paul Wetzel** has been appointed dispatcher.

Oliver Bishop, Zeigler, Ill., has been appointed a member of the state mining board in the department of mines and minerals, succeeding **Murrell Reak,** West Frankfort, who resigned to become a state mine inspector.

Four Kentucky district mine inspectors whose appointments were recently announced are as follows: **Marvin Rowe,** Martin; **A. C. Rudd,** Hazard; **Barzella Bates,** Neon; and **James Fleming,** Fleming, Ky.

Andrew Calderwood, for many years superintendent of the Putney, W. Va., mines of the Hatfield-Campbell Creek Coal Co., has retired and will live in Charleston. He served for two years as a state mine inspector in Gov. Hatfield's administration, returning at the end of that period to the Putney mines.

Richard D. Snouffer, formerly on the staff of Pennsylvania State College, has joined Newell G. Alford, consulting mining engineer, Pittsburgh, as an assistant mining engineer.

Robert M. Johnson, former captain in the Army Engineers, has joined the Pond Creek Pocahontas Co., Bartley, W. Va., as an assistant industrial engineer.

John H. Melvin, formerly treasurer and geologist for the Pennsylvania Drilling Co., has been appointed geologist for the State of Ohio, succeeding **George W. White,** new head of the department of geology, University of Illinois.

C. H. Johnson, for several years chief, Rolla (Mo.) Division, Mining Branch, U. S. Bureau of Mines, has been promoted to assistant chief, Mining Branch, with headquarters in Washington, D. C. **Leon W. Dupuy** has been transferred from Little Rock, Ark., to succeed Mr. Johnson.

Six new Illinois district mine inspectors were appointed last month, as follows: John Taylor, Eldorado; William Mitchell, Gillespie; Ed. Mallaburn, Johnston City; John D. Kinstler, West Frankfort; Arthur Plumlee, Cambria; and Sidney Smith.

William Keith Sr., Gillespie, Ill., has been appointed a member of the Illinois State Mines Board, succeeding William Mitchell, named a district mine inspector.

Albert B. Hill, vice president in charge of operations, Black Star Coal Corp. and Pioneer Coal Co., Louisville, Ky., has been named president of the companies, succeeding **William S. Speed,** who has become chairman of the board for the firms.

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Obituary

Frank Price, 57, Consolidation Coal Co. (Ky.), Jenkins, Ky., died Sept. 5 in the Jenkins city hospital after a prolonged illness. Mr. Price joined Consol in Jenkins 12 years ago.

James H. Rogers, 24, foreman, Badgett Mine Stripping Co., died Sept. 1 in the Hopkins County hospital, Madisonville, Ky., of injuries suffered in an automobile accident two days previously.

Arthur R. Pollock, 76, who retired in 1941 as general superintendent of Ford Collieries Co., Curtisville, Pa., died at his home in Gibsonia, Pa.,

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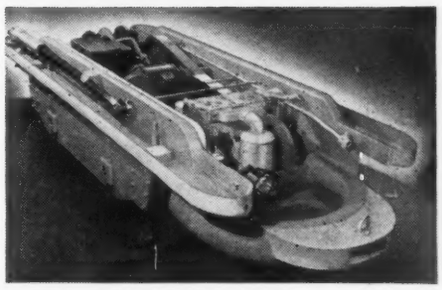

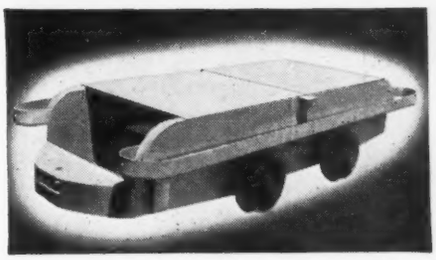

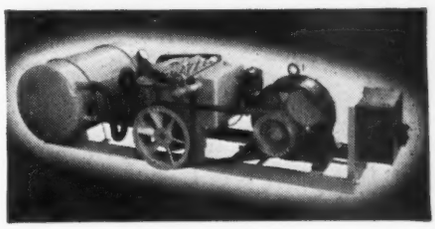

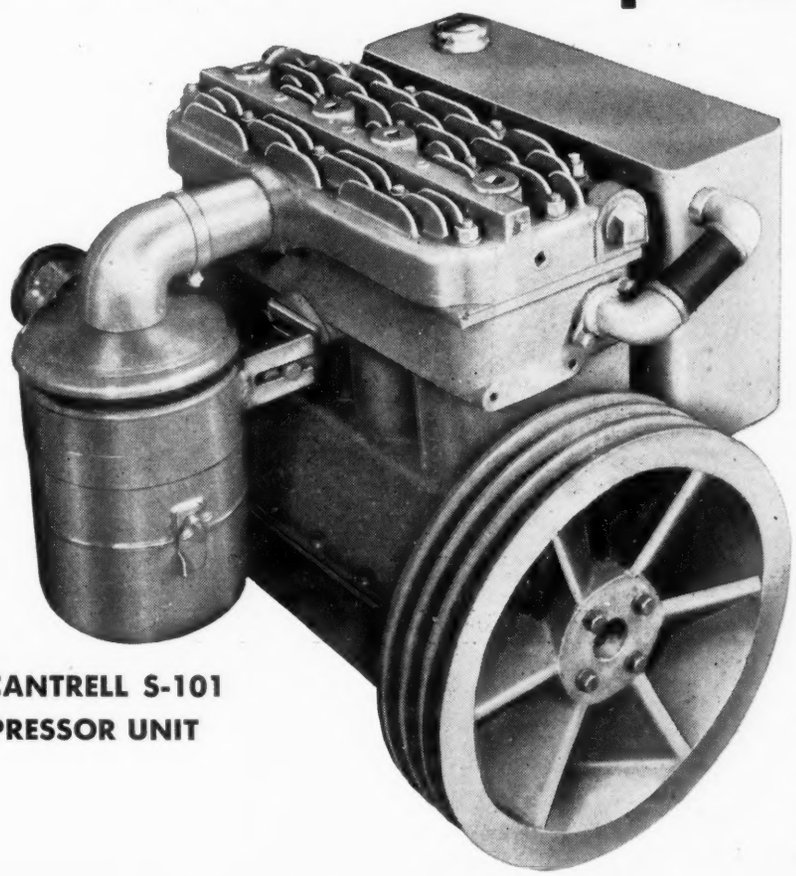

THE CANTRELL S-101 COMPRESSOR UNIT

Above, top to bottom: The Cantrell "SP" Self-Propelled Compressor . . . locomotive and compressor combination. The "MC" Mine Car Compressor easily transported in a train of cars or by your own locomotive. The Model "SL" Compressor for stationary use or mounted in your mine car. Left: Front view of the Cantrell "S-101" Compressor showing fly wheel with built in fan spokes for more efficient cooling.

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Cantrell COMPRESSORS

Aug. 25. Mr. Pollock was the first general manager of the company, being named to that position in 1909 when Ford mines were first opened.

Duncan C. Kennedy, 74, executive secretary of the Kanawha Coal Operators' Association until his retirement two years ago, died Sept. 22 in Winston-Salem, N. C., where he had lived for the last two years. Prominent in the area for many years, Mr. Kennedy was chairman of the Appalachian joint wage conferences in 1935 and 1937, and in 1943 was appointed by Secretary of the Interior Ickes as labor consultant to the coal mines administrator. He also attended the 1938 International Labor Conference in Geneva as a U. S. employers' representative in the coal discussions.

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Tonnage Miners Seek Boost in Rates

Fifteen Central Pennsylvania locals have requested John L. Lewis, president, U.M.W.A., to reopen the wage contract signed in July to obtain more pay for tonnage miners. The original request was made Aug. 26 and was followed by a second request that grew out of a committee meeting Sept. 8. James Richardson, chairman of the committee, pointed out that the new contract did not change the rates paid to workers in non-mechanized mines on a tonnage basis rather than a flat daily scale. No comment was issued from U.M.W.A. headquarters in Washington, D. C.

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Mine Fatality Rate Increases in July

Accidents at coal mines in the United States caused the deaths of 82 bituminous miners and 11 anthracite miners in July, 1947, according to reports furnished the U. S. Bureau of Mines by state mine inspectors.

For the two industries combined, in producing 43,781,000 net tons, the preliminary fatality rate in July was 2.12 per million tons, an increase over the latest figure of 1.32 for June, 1947, and that of 1.30 for July, 1946, later revised to 1.50.

With a production of 39,690,000 tons, the preliminary bituminous fatality rate was 2.07 per million tons in July, as compared with the latest rate of 1.32 for June, 1947, and the revised rate of 1.50 for July, 1946.

The preliminary anthracite rate for July, 1947, in mining 4,091,000 net tons, was 2.69 per million tons, as compared with the latest June rate of 1.30 and the revised rate of 1.52 for July, 1946.

July, 1947, fatalities, by causes and states, and comparable rates for the first seven months of 1947 and 1946, were as follows:

Contract Let for Coal Gasification Pilot Plant

Contract for the design and construction of its new coal-gasification pilot plant (Coal Age, April, p. 130) has been awarded by the Pittsburgh Consolidation Coal Co., to the Chemical Plants Division of the Blaw-Knox Co., according to an announcement issued Aug. 27. Estimates of the cost of construction exceed $500,000. The plant will be located at Library, Pa., near the coal company's research center. Construction is expected to begin later this year. The pilot plant will be an integrated continuous-process unit and will generate about 1,000,000 cubic feet of synthesis gas per day. R. V. Safford has been placed in charge of the new plant.

•

Township Taxes Coal For School Use

A special tax of 5c. a ton on all coal produced in Lawrence Township, near Clearfield, Pa., has been levied by the school board of the township, effective Oct. 15. The proceeds from the tax are to be collected monthly and will be used for increased teachers' salaries and other school operating expenses. It is being vigorously opposed by U.M.W.A. locals and coal operators in the area, and a court action to prevent collection was expected within 30 days.

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Company Sues Union Under Taft-Hartley Law

Damages of $125,000 are being sought by the Sentry Coal Mining Co., Kansas City, Mo., from the U.M.W.A. in a suit filed in the Western district federal court, Owensboro, Ky., Aug. 21. The company, which operated a strip mine near Madisonville, Ky., for about 10 years, alleges that the U.M.W.A. unlawfully "caused, induced, forced and compelled" the employees of Jackson Construction Co., contractors for a new Sentry mine at Echols, to quit work on the new mine. The mining company charges that the union took its action to force the Sentry organization to recognize and bargain with the union, which never had been the certified bargaining agent for the company's employees. Jess Lovelace, secretary-treasurer, District 23, U.M.W.A., was served Sept. 2 with a summons to answer the suit in 20 days.

U. S. COAL-MINE FATALITIES IN JULY, 1947, BY CAUSES AND STATES

State	Underground: Falls of roof	Haulage	Gas or dust explosions	Explosives	Electricity	Machinery	Other causes	Total underground	Open-cut	Surface	Grand total
Alabama	1	..	..	..	..	..	..	1	..	..	1
Colorado	..	..	..	..	..	..	..	..	..	2	2
Illinois	3	1	27	..	..	..	..	31	..	..	31
Indiana	3	..	..	..	..	..	..	3	..	..	3
Kentucky	7	1	..	..	..	..	..	8	..	..	8
Ohio	..	..	..	..	..	..	..	..	1	..	1
Penna. (Bituminous)	4	4	..	..	1	..	..	9	1	1	11
Virginia	4	1	..	2	..	..	..	7	..	..	7
West Virginia	8	3	..	..	2	2	..	15	1	2	18
Total Bituminous	30	10	27	2	3	2	..	74	3	5	82
Penna. (Anthracite)	8	1	..	..	1	..	1	11	..	..	11
Grand Total	38	11	27	2	4	2	1	85	3	5	93

DEATHS AND FATALITY RATES AT U. S. COAL MINES, BY CAUSES OF ACCIDENTS*, JANUARY-JULY, 1947 AND 1946

Cause	Bituminous: Number Killed 1947	1946	Bituminous: Killed per Million Tons 1947	1946	Anthracite: Number Killed 1947	1946	Anthracite: Killed per Million Tons 1947	1946	Total: Number Killed 1947	1946	Total: Killed per Million Tons 1947	1946
Underground:												
Falls of roof and face	256	226	0.732	0.784	42	61	1.318	1.758	298	287	0.780	0.888
Haulage	116	94	.331	.326	13	13	.408	.374	129	107	.338	.331
Gas or dust explosions:												
Local	4	..	.011	....	..	..	....	....	4	..	.010	....
Major	146	27	.417	.094	25	..	.784	....	171	27	.448	.084
Explosives	13	8	.037	.028	4	5	.125	.144	17	13	.045	.040
Electricity	9	11	.026	.038	1	3	.031	.086	10	14	.026	.043
Machinery	18	15	.051	.052	..	1	....	.029	18	16	.047	.050
Shaft	2	6	.006	.021	1	1	.031	.029	3	7	.008	.022
Miscellaneous	10	14	.029	.048	3	9	.094	.259	13	23	.034	.071
Total underground	574	401	1.640	1.391	89	93	2.791	2.679	663	494	1.736	1.529
Stripping or open-cut	19	14	.054	.048	3	5	.094	.144	22	19	.058	.059
Surface	26	28	.075	.097	11	7	.345	.202	37	35	.097	.108
Grand total	619	443	1.769	1.536	103	105	3.230	3.025	722	548	1.891	1.696

*All figures are subject to revision.

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BOSTON WOVEN HOSE & RUBBER COMPANY
DEPENDABLE RUGGEDNESS
Tough abrasion-resisting rubber covers and edges
Anti-mildew treated heavy duck (usually 42 oz.)

TOUGH UNDERCOVER JOB BRINGS NEW RECORDS TO LIGHT

Another top performance by a BWH product

Far below ground in a Pennsylvania coal mine, this conveyor belt had to take punishment, and then some. The installation involved right-angle feed, tandem drive and lopsided distribution of heavy loads. And dark, damp operating conditions made the belt an ideal incubator for mildew spores, whose growth inevitably cause deterioration.

A BWH Colliery King Belt was installed, mildew-inhibited by a special process developed by BWH technologists. Because it is produced by the exclusive ROTOCURE method of continuous vulcanization which eliminates weak spots caused by press overlaps, the Colliery King has powerful endurance. As a result, it did a record-making job in this mine, at minimum maintenance cost.

This "know how" in producing conveyor belts of extraordinary toughness is one reason why BWH is known throughout industry for its high achievements. Whatever your needs in rubber goods, look to BWH for dependable ruggedness . . . to BWH distributors for dependable service.

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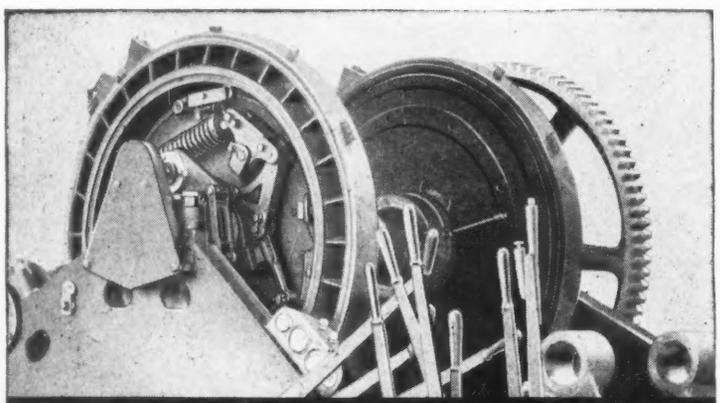
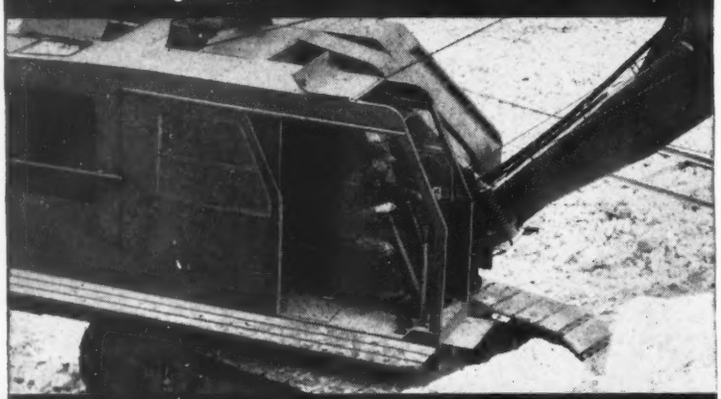
KOEHRING

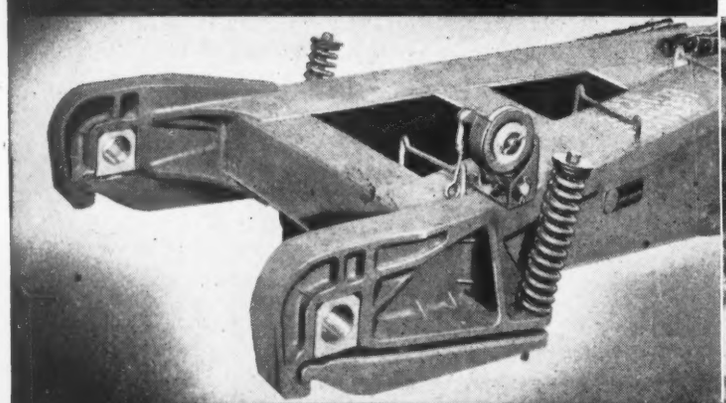
Output Per Shift



Engine power does the heavy work, supplies 90% of the effort when operator sets these main drum clutches on the Koehring 605.



Light lever pull, 7 lbs. average, eliminates operator fatigue. No costly production letdown at shift end.



Two coil-spring shock absorbers, one on each side of boom-foot, cushion out shocks and stresses of rock handling.

1 New Exclusive Power Clutch Steps Up Operator Efficiency

Top production all day long, because the Koehring 605 is easy on the operator. No physical fatigue, because heavy hand-lever pull is eliminated. Engaging the Koehring 605 Power Clutch, takes only 1/10 the lever pull required to set a manual clutch of similar size. Lever pull is rarely more than 7 lbs. No nervous fatigue, because "Feel of Load" has been retained. Clutch is completely responsive.

2 Boom Foot Shock Absorbers Step Up Rock Digging Output

Coil-spring shock absorbers, one on each side of boom foot, protect the Koehring 605 against boom strains and sudden loads. This not only insures against boom troubles and delays, but also speeds up entire digging cycle. With the 605, your operator can use full speed up through the bank without fear of catching a ledge or niggerhead on the corner . . . can use full throttle on the swing, brake sharply over the truck, letting the shock absorber take care of "whip" action.

See your Koehring Distributor for more information on the 605.

With entire shovel shock-absorber protected, it's safe to handle big dipper loads like this. No danger of boom trouble here.

KOEHRING COMPANY Milwaukee 10, Wis.

Subsidiaries: JOHNSON • KWIK-MIX • PARSONS

605 SHOVEL
Stepped Up 2 Ways

KOEHRING DUMPTOR: A Hauling Unit Built by a Shovel Manufacturer

Gravity Dump . . . No Body Hoist: Touch release lever and gravity tilts scoop shaped body instantaneously. Always dumps fast and clean. No maintenance on hoist unit.

High Speed . . . Reverse or Forward: No slow turns shuttling from shovel to dump. Dumptor travels as fast in reverse as forward. Eliminates time wasted turning, speeds spotting.

Armco Mining Division Holds 17th Safety Meet

More than 4,000 people attended the 17th Annual Safety Day and First-Aid Meet of the Mining Division of the American Rolling Mill Co., held at the Highland Country Club, near Nellis, W. Va., Aug. 23. Seven teams competed, representing the company's various mines at Nellis, Montcoal and Stickney, and the program included a full day of sports events, games, fireworks and dancing. Director of the meet was James H. Forgie, safety engineer for Armco. C. E. Linkous, U. S. Bureau of Mines, Beckley, W. Va., was chief judge.

Team No. 2 of Nellis won first place in the meet, with a perfect score of 500 points. Team No. 4 of Nellis was second, with 499½ points; Team No. 6 of Nellis, third, with 498⅔ points; and Team No. 1, Montcoal - Stickney, fourth, with 493⅓ points. In their division, Team No. 3, Montcoal-Stickney girls, took first place with 499½ points; Team No. 7, Nellis girls team, was second, with 498⅓; and Team No. 5, Boy Scout team of Nellis, third, with 494⅔.

•

Youngsters Learn About Coal in One-Day Meet

More than 150 boys from high schools in Johnson, Floyd, Letcher and Pike Counties, Kentucky, gathered at the Mayo State Vocational School, Paintsville, on Sept. 20 for the first annual "High School Seniors Day," sponsored by the Big Sandy-Elkhorn Coal Mining Institute. The program, a pioneer effort, was set up as the first step in a long-range program to attract young men of the area into coal mining as a vocation. Boards of education and high-school faculties in the four counties cooperated in the plan and students were brought to Paintsville from surrounding counties in public-school buses.

The day-long program included the following: movies of mining equipment, furnished by the Goodman Mfg. Co. and the Jeffrey Mfg. Co.; a tour of the Mayo State Vocational School; an exhibit of liquid-oxygen processes, set up by the Air Reduction Sales Co.; and talks on the geology of coal, by D. J. Jones, Kentucky state geologist; the uses of coal, by M. D. Cooper, vocational director, National Coal Association; mining methods, by Carel Robinson, consulting engineer, Charleston, W. Va.; health and safety in mining, by Dan Harrington, chief, health and safety division, U. S. Bureau of Mines; and the future for trained men in the coal industry, by C. S. Carter, head of the Mining Engineering Department, University of Kentucky. Other comments were made by Harry LaViers, president, Big Sandy-Elkhorn Coal Operators' Association, and J. L. Patton, director, Mayo State Vocational School.

Ball-Bearing Life Discussed Before Mining Electrical Group

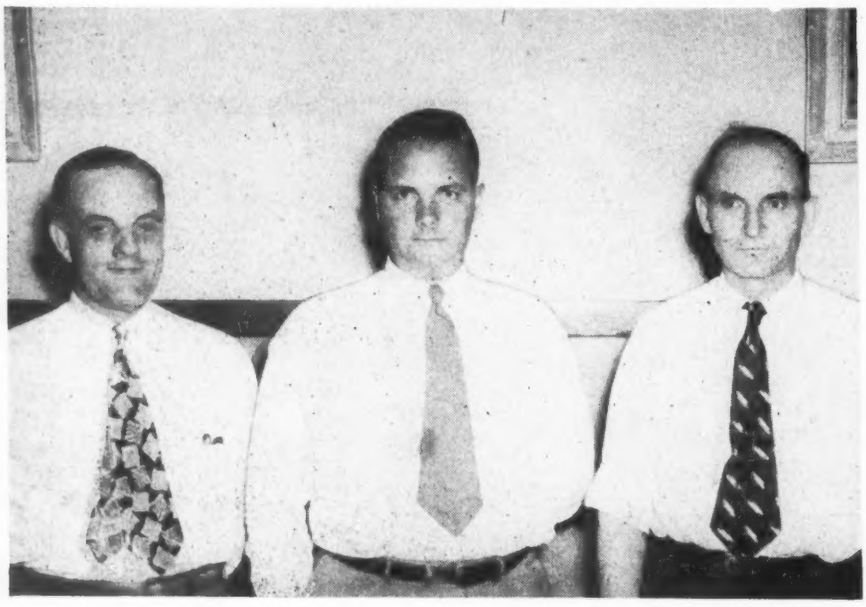
Ball bearings have a great amount of flexibility and, when at work, the balls and raceways are constantly flexing under a turning load, declared Ed. Olson, sales engineer, New Departure Ball Bearing Co., at the Sept. 4 meeting of the Mining Electrical Group at West Frankfort, Ill. The program was sponsored by the Bearings Service Co. of Marion, Ill., and marked the beginning of the eleventh year for the society.

Speaking on bearing life and some of the factors that influence it, Mr. Olson said, a ball bearing must have flexibility to withstand the expansion necessary for the introduction of the last two or three balls in its assembly. Because the bearing is constantly flexing it is subject to metal fatigue and therefore has a definite or known life for a given set of operating conditions. It is possible, he said, to press a loose fit-up bearing on an oversized shaft without shortening the bearing's life, but pressing a tight fit-up bearing on an oversized shaft would be inviting bearing failure.

Some complaints on bearing service tell of replacement bearings not lasting as long as the original ones. A hump on the shaft can soon cause one on the inner raceway and the bearing will pound out quickly. Likewise, an egg-shaped housing will tend to cause the outer ring to conform to that shape and will hasten the destruction of the bearing. Another way to hammer out bearings quickly is to mount them on a shaft that is out of balance. This condition will be accentuated if the housing fit is sloppy.

Ball bearings operating in a normal manner really never wear out, said Mr. Olson, they finally fail because the metal gives way and the balls or raceways start flaking off. On a tight fit-up bearing there already is imposed a light load because of forcing larger balls between the raceways than the raceways were built to accommodate. Were this bearing pressed on an oversized shaft or used where it would be subjected to a lot of heat, it would fail. Where it is necessary to use a tight fit-up bearing to prevent ball skid on heavy radical loads or for rigid shaft location, it is important that the shaft size be correct, that there is not too much heat and there is one floating bearing to accommodate shaft expansion.

The only point of friction in a ball bearing and the only need for lubrication, other than cooling, is where the separator rides on the balls. Wherever the balls contact the raceways they are turning and there is little or no wear. Bronze and non-metallic separators out-last the steel-type separator, especially on high speed, high-heat applications. In steel mills where bearings are subjected to a lot of heat, bronze separators are used because the bearings will become loose from metal fatigue and will give ample warning before they fail completely. With a bronze separator, the holes for the balls will wear



Ed. Olson (center), New Departure Ball Bearing Co., Indianapolis, Ind., and Bearings Service Co. representatives George Kostbade (left), of Evansville, Ind., and Thomas Bean (right), of Marion, Ill., at the meeting of the Mining Electrical Group, West Frankfort, Ill.

WHILE WE DELAY—

Russia Drives for the Atlantic

IN THE STRUGGLE to keep western Europe west of the Iron Curtain it is later than you think. Unless the United States quickly mobilizes its own and other nations' resources, World War II will be lost as World War I was lost—by no economic follow-through.

Millions of people in western Europe, living in cold homes or no homes at all, face another winter of near starvation. Some countries are absolutely without dollars to buy abroad the food and fuel they need for survival. Others slide toward that desperate state.

In this welter of misery Russia grasps for dominion over all Europe. Everywhere, as cold and hunger deepen and as men begin to doubt America's determination to help, Russia turns on the pressure. In France the Communists drive to overthrow the Government. In Italy they do likewise. In Greece Russia kills the United Nations investigating commission. In Trieste Tito elbows us out of the way. In Germany and Austria the Soviet commanders alternately stymie and flout the Allied governments.

FACED WITH this bloodless attack, the leaders of western Europe and of the United States have not covered themselves with glory.

Look, for example, at what the sixteen European countries participating in the Paris meetings on the Marshall "plan" first proposed to the United States as a catalog of their needs. In the main it was simply an adding up—to $30 billion—of what the various countries thought they needed to keep going in the same old way at the same old stands. There was no real start on plans for the mutual aid by European states which is the essence of a successful recovery program . . . no real start on plans to knock down the barriers which divide European trade into hopelessly inadequate little pockets . . . no real plans to clean up currencies which deteriorate so fast nobody wants to work for them. *In fact no plans to make people want to work.*

Meanwhile, what have our leaders offered? Not much more than one fine commencement speech by General Marshall, outlining a good idea, and a couple of carloads of statistics, with more to come.

Not even a beginning has been made on the most crucial part of any European aid program—*that of explaining to the American people what their part must be and why.* It is true that not all the reports of all the statistical committees have been completed. They never will be. But it is also true that the broad outlines of what the United States must do to save Europe are already clear. And it is not simply to provide more dollars, although $12 to $16 billion more—the cost of 6 or 8 weeks fighting in World War II—may be required.

A far more basic requirement is leadership which will lift Europe out of the slough of despair and get recovery rolling. Without that leadership more billions for Europe will buy us nothing but more bitterness and remorse on both sides of the Atlantic.

WHAT ARE the ingredients of that leadership? Here are a few:

1. A bi-partisan program for European recovery.

It should be so thoroughly understood and so overwhelmingly supported by both parties that playing politics with it will be like selling military secrets to the enemy.

Truman and Vandenberg have failed miserably to develop and explain a complete program—one in which Europe and America can have full confidence. Nor have Taft and Dewey and other candidates for high office pledged that politics will stop at our shoreline. These men must speak out. To date Herbert Hoover alone has had the courage and vision to state a program.

2. A mobilization of American food supplies.

We must assure people at home and abroad that our crops, cut down by drought and heat, will be stretched to cover minimum European needs (with whatever help we can muster from other nations) without forcing still higher food prices here.

Some food experts are comfortably confident that the stretching can be done. But

meatless and wheatless days, higher extraction of flour from wheat and similar voluntary conservation moves would make it surer. And they would demonstrate that a free country can mobilize itself to meet a very serious crisis.

3. An understanding that relief is one problem and recovery another.

Both problems must be solved. Relief emergencies must be met, some of them at once. But they must not black out the longer task of recovery. Italy illustrates the point. Italy, particularly the south, is flat broke. Help is needed right now to keep people from dying in the streets. But we must eventually do more than keep the Italian people alive. We must help them get back to useful work so that they can stand on their own feet.

4. A steady insistence on results—which means that Europe must find a way to make its people want to work.

In the U.S.S.R. they have a way to get things done. It is to liquidate those who do not work. In the U.S.A. we have a way to get things done. It is to create incentives to make people want to work. Western Europe, notably France and Britain, has fallen between two stools. It has socialized away the incentives, and it does not yet, thank heaven, enslave the laggards. We should make it crystal clear that we have no designs on the national "sovereignty" of others. But we should make it equally clear that we insist that those countries which receive our aid work hard enough to get results. To this end continued aid should be on an installment plan, each installment conditional on getting results. Otherwise more billions can easily disappear down the drain.

5. Insistence on all-out self-aid by European countries.

That is the constructive core of the Marshall idea—to help Europe to help itself. In his brilliant "Report on Germany" and how to get it "off the backs of the American taxpayer," Lewis H. Brown, Johns-Manville Chairman, shows how the export of only 10 million tons of coal a year from Britain to western Europe would speed industrial recovery of the Ruhr immeasurably. There are countless other cases where effort in one European country—or a group of countries—will break a big industrial bottleneck in another. We should insist that everything possible be done to see they are broken.

6. An agreement with Britain and France giving us authority in western Germany equal to our responsibility.

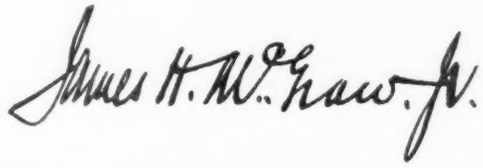
Britain is shifting to us most of the financial burden she has been carrying in the German occupation. Less directly we shall also be carrying much of the French occupation load too. We must have authority in the economic field commensurate with our responsibilities. Otherwise the management of western Germany can poison Anglo-American and Anglo-French relations in addition to wasting resources we could use to promote general European recovery.

It is truly said in the scriptures that the Lord loveth a cheerful giver. But it is not recorded anywhere that anyone, including the recipient, loves a soft-headed giver. Hence as a capstone any program of aid for Europe should have machinery assuring that only what is needed is sent; that what is sent does the job for which it is sent; and that arrangements are made for the recipients to pay back whatever they can.

THE AMERICAN PEOPLE should be told clearly by their leaders that there is no assurance that the best possible program of economic aid for Europe will do the job. The time is very late.

In France and Italy, as our help falters, the Communists right now are provoking strikes which will make the people's suffering more acute. They hope, of course, to overthrow the governments in both those countries and to seize control. If Communist dictatorships are clamped on France and Italy this fall, Russia and her satellites will have advanced to the Atlantic. The Iron Curtain will have moved 500 miles west—toward us.

Americans should be clearly told, therefore, that not to undertake an immediate program for the recovery of Europe is to bring closer the greatest possible national disaster—World War III.



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UNITED STATES STEEL

EQUIPMENT APPROVALS

Four approvals of permissible equipment were issued by the U. S. Bureau of Mines in August, as follows:

Joy Mfg. Co.—Type PP3-1PE post puller; 7½-hp. motor; 250-volts, d.c.; Approval 585; Aug. 13.

Goodman Mfg. Co.—Type 115 Conway shovel; two motors, 5- and 15-hp.; 230-volts, d.c.; Approval 586; Aug. 13.

Joy Mfg. Co.—Type U-327-1E/F boom car loader; 2-hp. motor; 250- and 500-volts, d.c.; Approvals 587 and 587A, respectively; Aug. 28.

Breeze Corps., Inc.—Magneto-generator-type 10-shot blasting unit equipped with time-limit switch; Approval 1602; Aug. 22.

ed in the housing then only about 20 percent of it will carry all of the load and the bearing will only give about 20 percent of its expected life. There are certain severe applications where it is necessary to lock the outer ring but on the average job a good rule to follow is to have a press fit on the rotating member and a push fit on the stationary one.

•

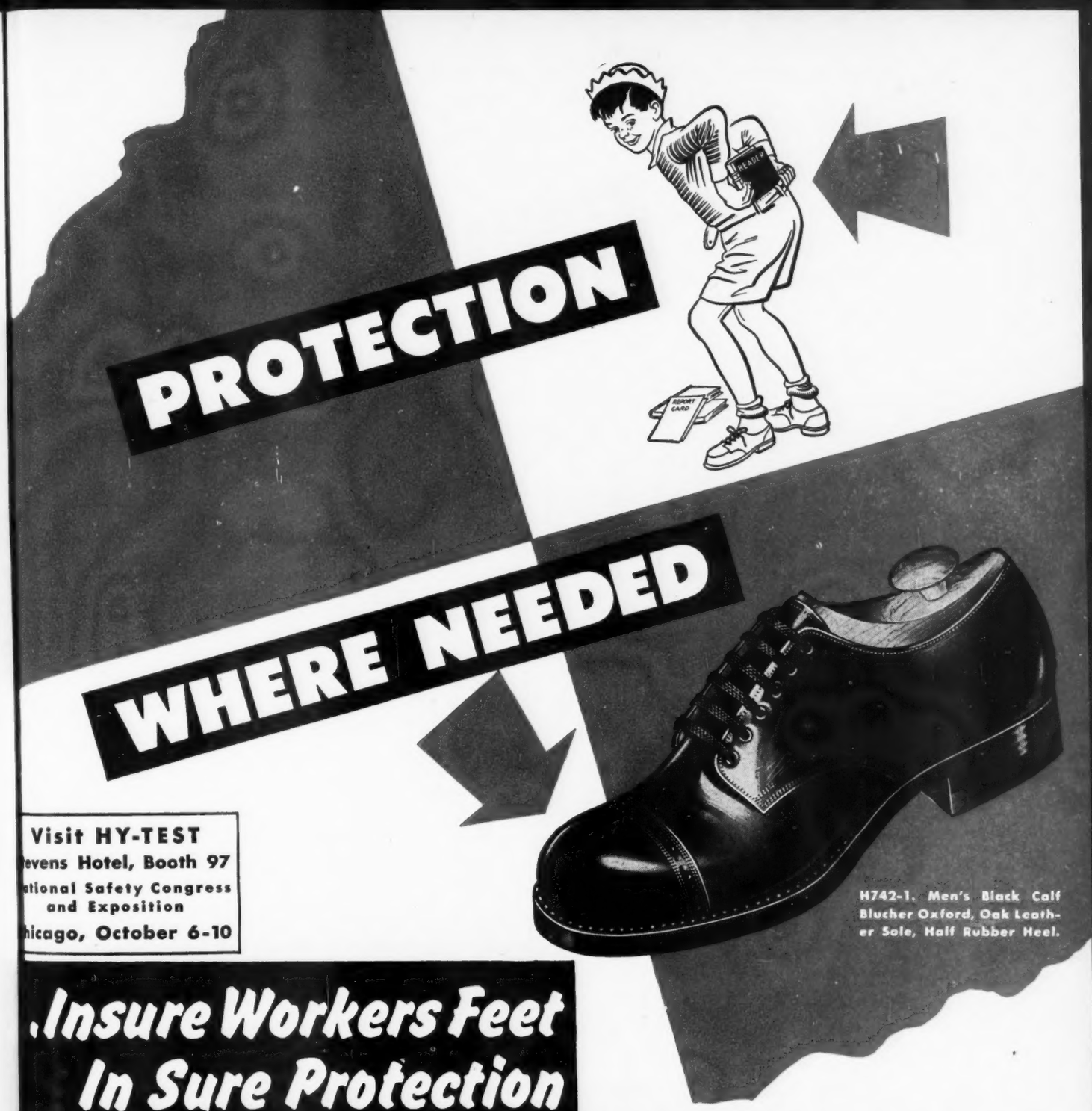
Carter Offers to Reopen Closed Mines

An offer to reopen the mines of the Carter Coal Co. at Coalwood and Caretta, W. Va., with a production bonus paid directly to miners instead of the royalty paid to the union welfare fund under existing union contracts, was being considered in conferences between James W. Carter, president, Carter Coal Co., and John O'Leary, vice president, U.M.W.A. in September. Mr. Carter's proposal, disclosed late in August, was made in a letter dated Aug. 8 and addressed to George Titler, president, U.M.W.A. District 29. More than 2,000 miners at the three mines at Coalwood and Caretta have been idle since July 1, when the government returned the bituminous mines to their owners. Mines of the Carter Coal Co. never have been organized.

•

Anthracite Strippers Slow in Licensing

Anthracite strip-mine operators who failed to apply for licenses under Pennsylvania's new strip-mining law before Sept. 1 were warned by Mines Secretary Richard Maize that they must cease operations or become liable for prosecution. Mr. Maize stated that 53 operators had requested licenses before the Sept. 1 deadline but added that there were about 100 operators in the field and that a field checkup



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with HY-TEST Safety Shoes

It's elementary. Even schoolboys know you've gotta' have protection where needed so blows don't hurt. Hy-Test Safety Shoes use that principle to sidetrack accidents. The *Anchor-Flange** Steel Box Toe has book learnin' back of it. Physicists figured out how to make it stand up under greater pressures, harder impacts. It's saved workers from a lot of punishment. Hy-Test Safety Shoes are comfortable and long wearing . . . made of all leather in vital parts. Sizes are 5 to 15 widths AA to EEE.

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This flange adds extra strength to the steel arch's sidewall. Anchored between insole and outsole, it also serves to resist shifting, tilting and cutting through outsole under impact.

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GENERAL ELECTRIC

would be made by state inspectors at an early date. The new Pennsylvania anthracite stripping law requires a fee of $25 an acre, with a $100 minimum, and a compliance bond of $200 an acre, with a $2,000 minimum. Operators removing less than 250 tons a year are exempt from the law.

Later in the month, the mines department announced that the registration had been completed, with a total of 73 operators registered. Appointment of David W. Cosslett, of Wanamie, Pa., as one of the three field inspectors to check on violations of the law, also was reported.

•

Strippers Join in New Permanent Organization

Bituminous strippers of 14 central Pennsylvania counties organized on a permanent basis at a meeting in Philipsburg, Pa., Sept. 2, when G. A. Stewart, Clearfield, former secretary, State Department of Forests and Waters, was elected executive secretary of the group on a full-time basis. Other officers were elected as follows: J. H. Wallin, Philipsburg, president; B. M. DuBois, Clearfield, vice president; R. S. Walker, Bigler, secretary; and T. F. Morgan, Philipsburg, treasurer. The following directors were named: Robert Bailey, Morrisdale; R. S. Walker, Bigler; Everett Moore and George Yoxtheimer, Punxsutawney; B. M. DuBois, Clearfield; W. T. Harvey, J. H. Wallin, E. B. Putnam, Louis Stein, T. F. Morgan, Alex Bailey, Herman Moore and Ralph Kuhns, all of Philipsburg; Robert McCormick, Barnesboro; and J. J. Ernest, Osceola Mills.

The new organization is to be known as the Central Pennsylvania Open-Pit Mining Association, and permanent offices will be maintained by Mr. Stewart in the First National Bank Bldg., Philipsburg, Pa.

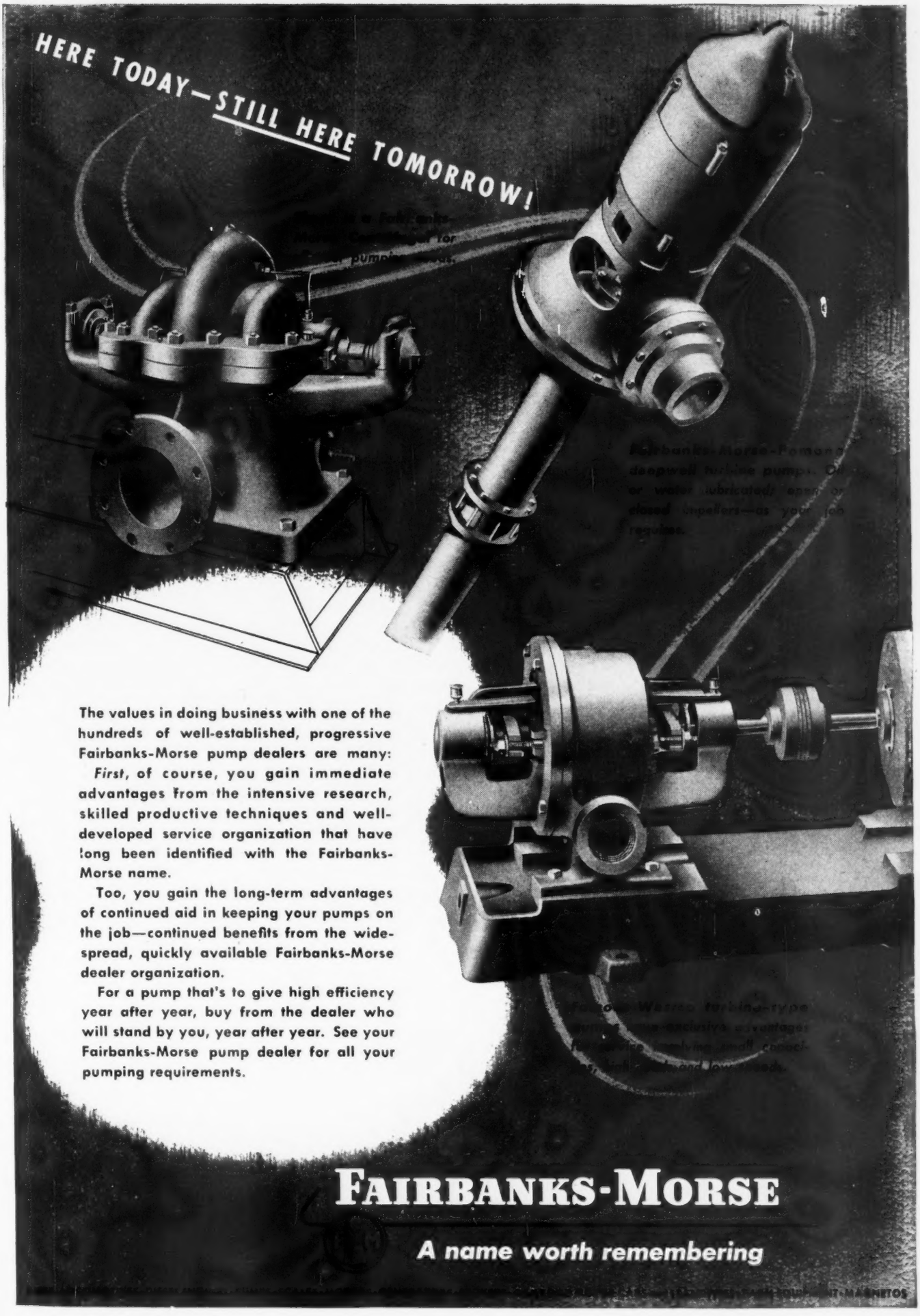
•

Joint Fuels Conference Program Announced

Subjects tentatively set up for discussion at the Tenth Fuels Conference, to be held in Cincinnati, Oct. 20-21, were released late in August and include, among other things, coal preparation, smoke abatement, stoker design, underground gasification of coal, plant and boiler-room design and underground power distribution. Sessions will be held in the Gibson hotel. The conference is sponsored jointly by the Coal Division, American Institute of Mining and Metallurgical Engineers, and the Fuels Division, American Society of Mechanical Engineers.

Papers of special interest to coal operating men include the following:

"Performance of the Cyclone As a Thickener of Coal Slurry," by H. F. Yancey, supervising engineer, and



The values in doing business with one of the hundreds of well-established, progressive Fairbanks-Morse pump dealers are many:

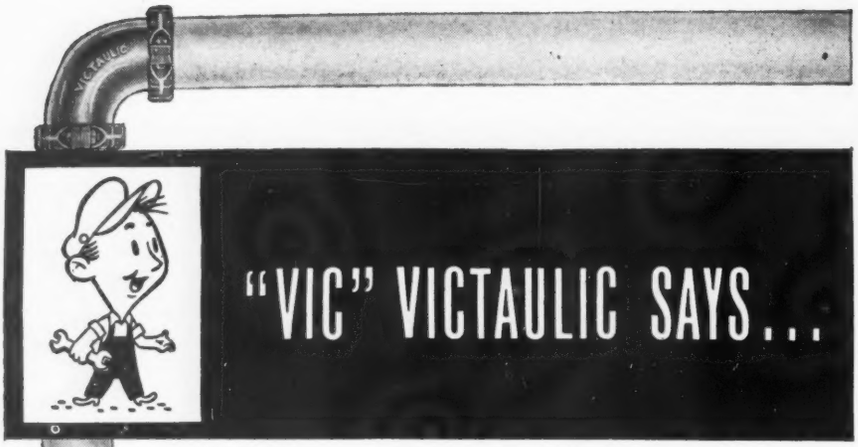
First, of course, you gain immediate advantages from the intensive research, skilled productive techniques and well-developed service organization that have long been identified with the Fairbanks-Morse name.

Too, you gain the long-term advantages of continued aid in keeping your pumps on the job—continued benefits from the widespread, quickly available Fairbanks-Morse dealer organization.

For a pump that's to give high efficiency year after year, buy from the dealer who will stand by you, year after year. See your Fairbanks-Morse pump dealer for all your pumping requirements.

FAIRBANKS-MORSE

A name worth remembering



"VIC" VICTAULIC SAYS...

"On Piping Installations . . . We'll Save You Money and Man-Hours!"

"Before you install any piping system, remember this: to save money and man-hours...use Victaulic Couplings!

"Because the easy 'two-bolt way' of locking Victaulic Couplings gives you speed and ease of assembly — or salvage. There's no guesswork, no marking of pipe, no special skill or training needed — just 'button up' two half-housings with a speed socket wrench and you've got a *flexible* pipeline with a *union at every joint!*

"In Victaulic-coupled pipelines contraction-expansion is taken care of *automatically* . . . and any pipe length, valve or fitting can be removed for repairs without backing off adjoining sections.

"So — not only are Victaulic Couplings your answer for low-cost installations. They're also your answer for low-cost maintenance!

"And for *full economy* in your pipeline, be sure to use Victaulic Full-Flow Elbows, Tees and other Fittings. They increase pipeline output...*at lower pumping costs!*"

Write for new Victaulic Catalog and Engineering Manual

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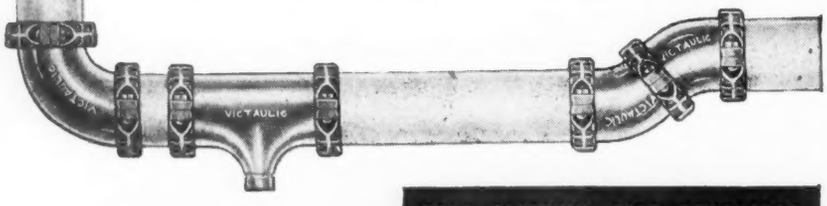

Have you considered Victaulic for your piping requirements?
Sizes — ¾" through 60"

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EFFICIENT FULL-FLOW FITTINGS

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M. R. Geer, mining engineer, Northwest Experiment Station, U. S. Bureau of Mines, Seattle, Wash.

"The Dorrance Colliery Cleaning Plant," by T. R. Workman, vice president, and H. D. Bowker, preparation engineer, West Virginia Coal & Coke Corp., Omar, W. Va.

"Underground Gassification at Gorgas, Ala.," by M. H. Fies, consulting engineer and manager of coal operations, Alabama Power Co., Birmingham, Ala., and W. C. Schroeder, chief, Office of Synthetic Liquid Fuels, U. S. Bureau of Mines, Washington, D. C.

"Sectionalizing Power Distribution Underground," by A. L. Barrett, maintenance engineer, Pittsburgh Coal Co., Library, Pa.

"Estimates of Moisture Increases Due to Water Spraying for Dust Control," by A. I. M. E. Coal Preparation Committee, T. W. Guy, chairman, consulting engineer, Charleston, W. Va.

•

Anthracite Laboratory Slated for July, 1948

The $450,000 anthracite laboratory to be built near Schuylkill Haven, Pa., probably will be in operation by July, 1948, it was stated recently in Washington, D. C., by Dr. A. C. Fieldner, chief, fuels and explosives division, and Louis McCabe, chief, coal division, U. S. Bureau of Mines.

Tentative plans call for a 3-story building with 29,200 sq. ft. of floor space that can be enlarged when and if Congress increases the appropriation. It will be staffed by about 33 technicians, clerks and maintenance personnel. Congress has appropriated $175,000 for the first year's maintenance, staff salaries and research.

•

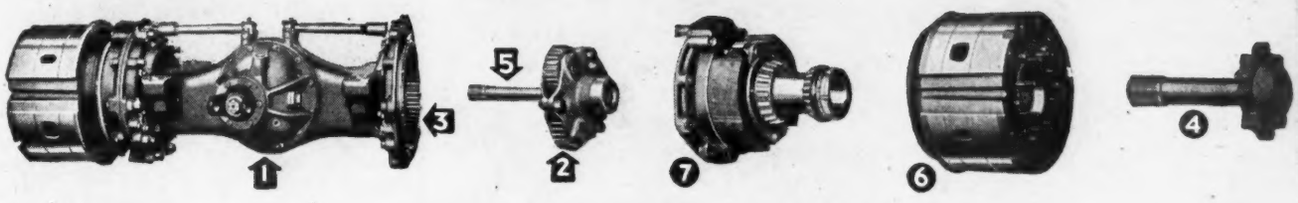
Island Creek Renews Students' Summer Jobs

The Island Creek Coal Co., Huntington, W. Va., has revived its program of hiring college mining students for summer work after a wartime lapse, it was announced by company officials, Sept. 13, when J. D. Francis, president, and R. E. Salvati, vice president for operations, entertained five college men at a luncheon prior to the opening of college this fall. According to the announced plan, these students will spend their summers before graduation as employees of the company to learn mining practices and methods and eventually will become a part of the company's supervisory forces. On the day before the luncheon, the young men had ended their summer work for this year with a tour through the company's offices in Huntington and a visit to its river plant.

Members of the student group, all

LONGER LIFE... OUTSTANDING PERFORMANCE in this...

EUCLID DRIVE AXLE



THIS double reduction planetary drive axle transmits tremendous pulling power with relatively little burden on the intermediate driving parts — transmission, differential, etc.

It is full-floating — all of the rear axle load being carried on heavy duty tapered roller bearings mounted on hollow axle spindles which keep axle shafts and gears entirely free from vehicle and payload weight. All working parts of this precision built axle assembly are completely enclosed in an oil bath.

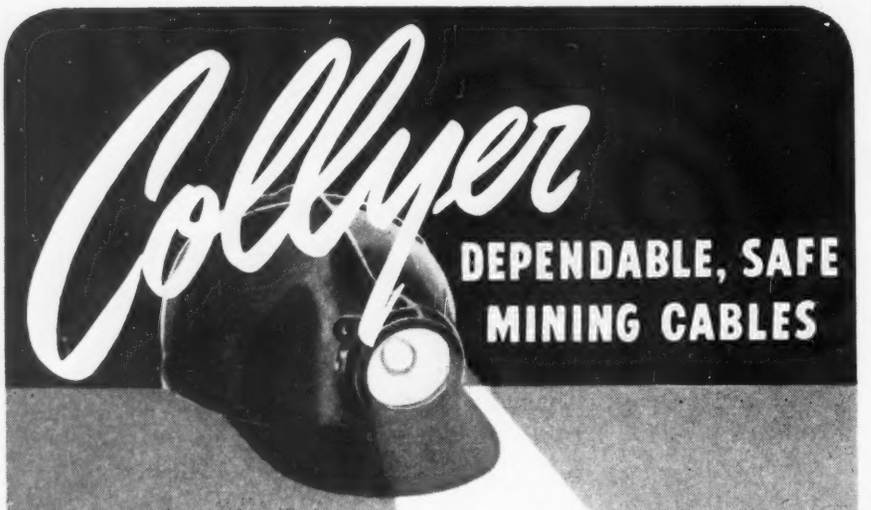
This type of drive axle has been used in both Rear-Dump and Bottom-Dump Euclids *for 14 years.* Its strength and capacity are unequalled by any other axle in heavy duty hauling equipment. The Euclid axle is a highly important factor in the longer life and outstanding performance of Euclids.

Advantages of Euclid Planetary Drive Axle

The driving parts of the Euclid axle are (a) — a primary reduction consisting of conventional spiral bevel ring gear, pinion and differential (1), (b) — secondary reduction of two floating planetary gear sets (2) each made up of a sun gear, three planetary gears and internal ring gear (3). The only parts carrying the full driving torque are the outer drive axles and hub caps (4). The inner axles (5) carry less than 1/5 of the torque delivered to the driving wheels (6) which are mounted on tapered roller bearings on the hollow spindles (7). The use of the planetary reductions makes possible minimum gear reductions in the transmission and differential and results in much lighter loads being imposed on all parts between the planetary gears and engine.

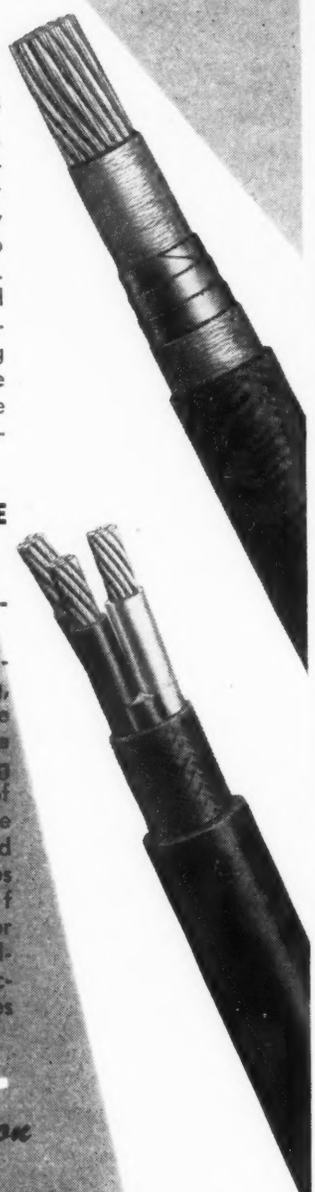
The EUCLID ROAD MACHINERY Co., Cleveland 17, Ohio

Collyer
DEPENDABLE, SAFE MINING CABLES



A TEAM TO MAINTAIN TONNAGE

FOR PERMANENT INSTALLATION
Collyer
A.V.C. POWER CABLES
Built to resist flame, heat, fumes, grease, oil and abrasion, Collyer A.V.C. Power Cables operate continuously at high temperatures up to 230°F and voltages to 7,500. Layers of impregnated felted asbestos, heat resisting varnished cambric and strong asbestos braids make these cables dependable and safe under the most difficult operating conditions.



FOR PORTABLE USE
Collyer
HEAVY DUTY NEOPRENE-SHEATHED CABLES
Extremely flexible for constant reeling and unreeling, Collyer Heavy Duty Neoprene Sheathed Portable Cables are handy to use, safe and long lived. Their smooth jacket of tough, lead-cured neoprene sheds dirt and grease and resists hard use. These cables meet fully the State of Pennsylvania requirements for flame resistance and are available, single and multi-conductor, in many types and sizes for voltages up to 4,500.

Write for Information
Collyer INSULATED WIRE CO.
245 ROOSEVELT AVE., PAWTUCKET, R. I.

veterans of overseas service with the armed forces, are: A. E. Singleton Jr., Portsmouth, Ohio; V. A. Lilley, Canton, Ohio; C. D. Hoyt, Montoursville, Pa.; I. M. Craig and George Dalton, Alexandria, Va. Mr. Lilley is a student in mechanical engineering and the others are mining engineering students. The young men attend colleges and universities in three states.

•

West Virginia Group Gives Scholarships

The first seven successful applicants for new scholarships at the University of West Virginia were announced by the West Virginia Coal Association Sept. 11. Winners will receive $625 each during the year for study in mining engineering. The association has announced that it will make similiar awards during the next four years until a total gift of $25,000 has been reached.

Winners, selected from 39 applicants, were chosen by the University Board of Governors on recommendation of the faculty of the school of mines. They included: D. L. Ashcraft, Wheeling; F. C. Debolt, Holden; L. R. Kay and W. J. March, Charleston; J. I. Poundstone, Morgantown; W. C. Taylor, Richwood; and J. A. Todd Jr., Madison.

•

Commerce Department Sets Oct. Export Quotas

Coal export quotas for October totalling 4,050,000 tons were announced Sept. 13 by the U. S. Coal Operating Committee after approval by Secretary of Commerce Averell Harriman. Of this amount, 3,500,000 tons is for European distribution. No export of anthracite in sizes Buckwheat No. 1 or larger will be authorized in October, the committee said. Ports of shipment will be designated by the committee with a view to easing transportation troubles and domestic supplies.

Since April, the committee has permitted exports of coal up to the handling capacity of U. S. ports. Shipments abroad in August totaled about 5,000,000 tons, highest to date under the program. May and June shipments were about 4,400,000 tons each. Allocations to Europe have been about seven-eighths of all coal exports.

•

Mines Bureau Studies German Synthetic Fuels

Several pieces of equipment used during the war to produce synthetic liquid fuels for the German air and ground forces have been brought to

MAGELLAN MIGHT HAVE MADE IT

IN 1519, Ferdinand Magellan set sail in five antiquated vessels in an attempt to circle the globe. He died before the voyage was completed although one of the ships did win through after three years of hardship. With power, even in its most elementary form, Magellan might have lived to see the success of his great adventure.

It was nearly three centuries until the successful voyage of "Fulton's Folly" proved that power at sea was practical. Since then, it has made giant strides of progress and in a short half century, Diesel engines have found an ever-growing usefulness.

Today, internal-combustion engines of all kinds are serving the world in its struggle for reconstruction.

AMERICAN BOSCH CORPORATION SPRINGFIELD 7, MASS.

SERVING POWER

American Bosch serves the internal-combustion-engine industry in three vital ways:

ENGINEERING. 1,200,000 *man-hours* of it have been poured into Diesel fuel injection alone—other millions into ignition.

PRODUCTION. *Premium performance* has been a consistent goal in the production of hundreds of thousands of Diesel injection systems and millions of electrical units.

MAINTENANCE. *The world over,* American Bosch authorized service stations keep the equipment operating efficiently.

AMERICAN BOSCH

PARTNERS IN THE PROGRESS OF POWER

DIESEL FUEL INJECTION • AUTOMOTIVE AND AVIATION ELECTRICAL PRODUCTS

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the United States for examination by the Bureau of Mines, according to a recent announcement. This equipment, together with German-made catalytic materials, has been consigned to the Missouri Ordnance Works near Louisiana, Mo., which now is being converted to a synthetic-fuels demonstration plant for obtaining oil and gasoline from coal. Among other items, these shipments from Germany include a 130-ton hydrogenation-process converter, a 60-ton gas-synthesis process converter, a 30-ton "wickel-ofen" heat exchanger, two 30-ton coal-paste injectors and a Linde-Frankl oxygen-plant unit.

•

Miners Back Boss In State Certificate Loss

Three hundred night-shift workers at the New Orient mine, Chicago, Wilmington & Franklin Coal Co., West Frankfort, Ill., appealed Aug. 22 to the Illinois Mining Board to revoke its action in suspending the certificate of night mine manager Arlie N. Cook. Mr. Cook's certification was suspended following the death of three men in a blast on Aug. 14, which was investigated by the state mining board. At a coroner's inquest after the explosion, Mr. Cook had testified that he had ordered the three men to await an examination of the working place before entering it and two witnesses had corroborated his testimony. The petition from night-shift workers stated that the signers had found Mr. Cook to be "an efficient, careful and safe supervisor."

•

Illinois Central R.R. Holds Kentucky Outing

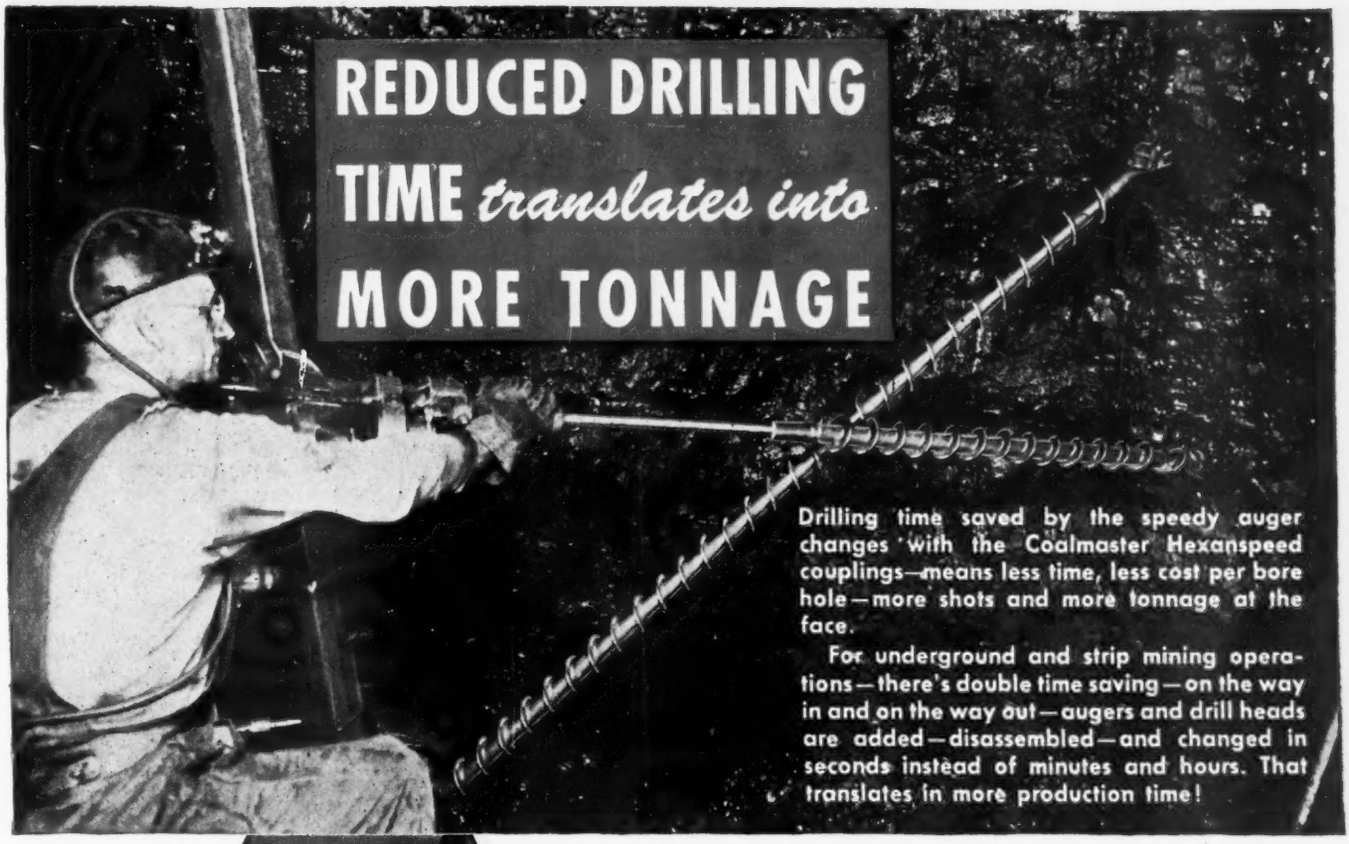
A large crowd, including coal men connected with offices in Chicago, Nashville, Memphis, Louisville and other cities, attended the annual outing of the Illinois Central R.R. for Western Kentucky coal operators, in the community park at Madisonville, Ky., on Sept. 13. It was reported that 1,500 lb. of barbecued ribs was served, together with fried fish and other trimmings, in fine weather.

•

$1,001,000 Paid By Anthracite Welfare Fund

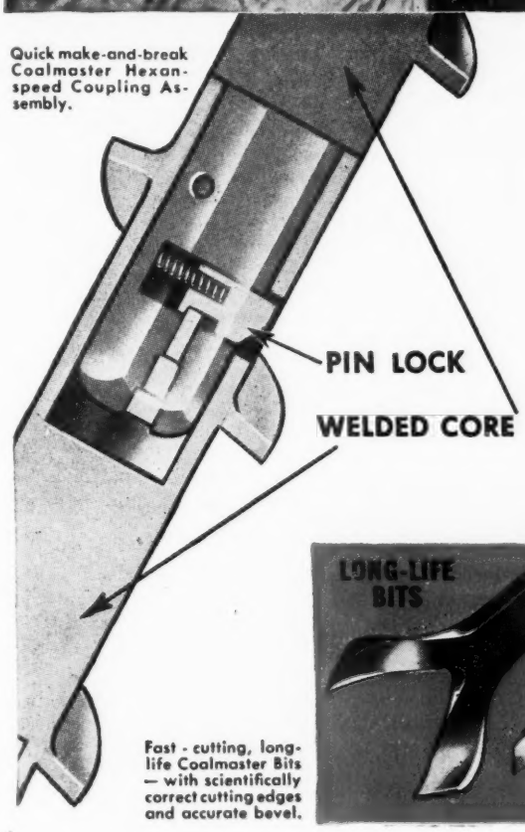
The Anthracite Health and Welfare Fund has written 1,001 thousand-dollar checks to beneficiaries of deceased members of the U.M.W.A. in the anthracite region since the effective date of the program on June 1, 1946, according to a statistical report issued by officers of the fund on Sept. 15, 1947. Payments were made to 464 beneficiaries in District 1 (Wilkes-

REDUCED DRILLING TIME *translates into* MORE TONNAGE



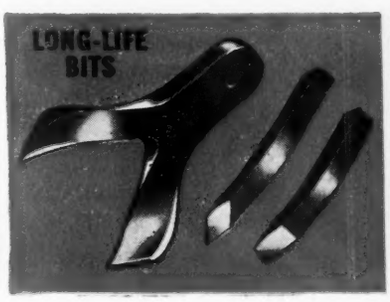
Drilling time saved by the speedy auger changes with the Coalmaster Hexanspeed couplings—means less time, less cost per bore hole—more shots and more tonnage at the face.

For underground and strip mining operations—there's double time saving—on the way in and on the way out—augers and drill heads are added—disassembled—and changed in seconds instead of minutes and hours. That translates in more production time!

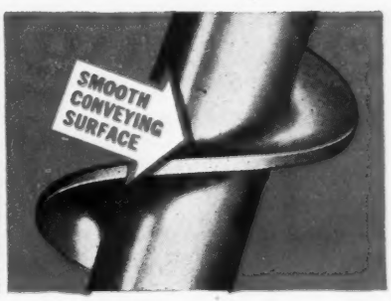


Quick make-and-break Coalmaster Hexanspeed Coupling Assembly.

Here's the time-saving, efficient Coalmaster Hexanspeed coupling in phantom view—to show the quick make-and-break feature that streamlines drilling operations. The hex shank with its pin-lock snaps right into the snug fitting hex socket—and the Spir-L-Weld flight of Coalmaster augers automatically fits flush and unbroken—on both drill head and auger couplings.



Fast-cutting, long-life Coalmaster Bits—with scientifically correct cutting edges and accurate bevel.



Coalmaster Auger—Spir-L-Welded for reduced flight drag and faster conveying.

DRILLING COALMASTER TOOLS

CENTRAL MINE EQUIPMENT COMPANY

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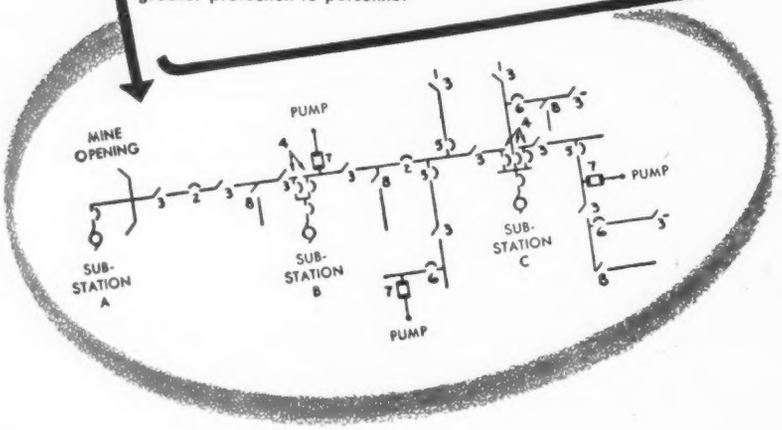
Boost Production *Tipple-high-*

APPLY AN I-T-E SECTIONALIZING PLAN LIKE THIS

The diagram below shows a few applications of I-T-E Sectionalizing Switchgear to mine electrical distribution systems. We can offer you many recommendations for raising production levels, and for giving greater protection to personnel and equipment. ***The I-T-E representative in your locality is fully qualified to assist you in adapting these sectionalizing recommendations for your mine. Use his services with no obligation.***



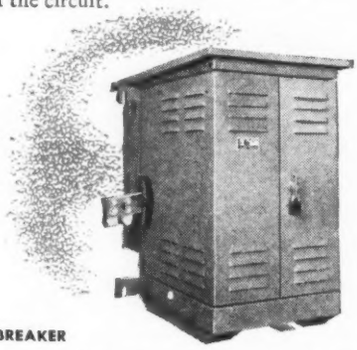
Key

2. I-T-E Type KSC Automatic Reclosing Circuit Breaker installed as overcurrent protective device between each two substations. The KSC protects feeders and equipment by detecting disturbances on either side.
3. A disconnect switch or protective device placed at not over 1500-foot intervals in every power line.
4. I-T-E Type KSA Automatic Reclosing Circuit Breaker used as an overcurrent protective device in each circuit leaving a substation.
5. I-T-E Type KSC used as an overcurrent protective device in each main branch circuit. It is rugged and compact in construction, readily portable, and can be moved as mining progresses and centers of loads change.
6. I-T-E Type KSC used as overcurrent protective device in secondary branch circuits.

Key

7. Circuits to pumps and other fixed loads have overcurrent protection at their supply ends.
8. Unimportant branch circuits such as infrequently used entries, spur tracks, etc., have switches for cutting off all power.

NOTE: In every case, sufficient feeder and return circuit capacity should be provided so that the circuit breaker will be opened by a dead short at the most remote point of the circuit.



The Heart of Protection . . . TYPE KSC
AUTOMATIC RECLOSING CIRCUIT BREAKER

The KSC was especially developed for the mining industry. It is completely metal enclosed for safety—yet readily accessible for inspections and maintenance. Overall height: 38⅝".

Be Production-Wise...Sectionalize

I-T-E
S-E-C-T-I-O-N-A-L-I-Z-I-N-G
SWITCHGEAR
The Leader in Technical Excellence

I-T-E Circuit Breaker Company, 19th & Hamilton Sts., Phila. 30, Pa. 31 Offices in U. S. & Canada

SWITCHGEAR • UNIT SUBSTATIONS • AUTOMATIC RECLOSING CIRCUIT BREAKERS

Barre-Scranton field), 296 in District 9 (Pottsville-Shamokin region) and 241 in District 7 (Hazleton-Tamaqua-Lansford area). Eighty-eight of the deceased had no dependents, 776 had one each and one had more than 10 dependants.

The report attributed 239 of the deaths to silicosis, 175 to mine accidents, 162 to heart diseases and 66 to cancer. Other causes of death were listed as cerebral hemorrhage, pneumonia, apoplexy, pulmonary diseases, tuberculosis and miscellaneous.

Prior to releasing the statistical report, officials of the fund, with the cooperation of nearly 250 local unions, completed a survey in August that indicated approximately 5,000 potential eligibles for grants from the fund.

•

Fall Mining Classes Start in West Virginia

Mining extension classes sponsored by the University of West Virginia opened in eight centers in the state during the week of Sept. 15. Training centers are Bramwell, Beckley, Richwood, Mt. Hope, Montgomery, Madison, Logan and Morgantown. Students pay a fee of $5 upon enrollment, which is refunded to all who attend 80 percent of the classes. Enrollment last year totaled 1,200 throughout the state.

•

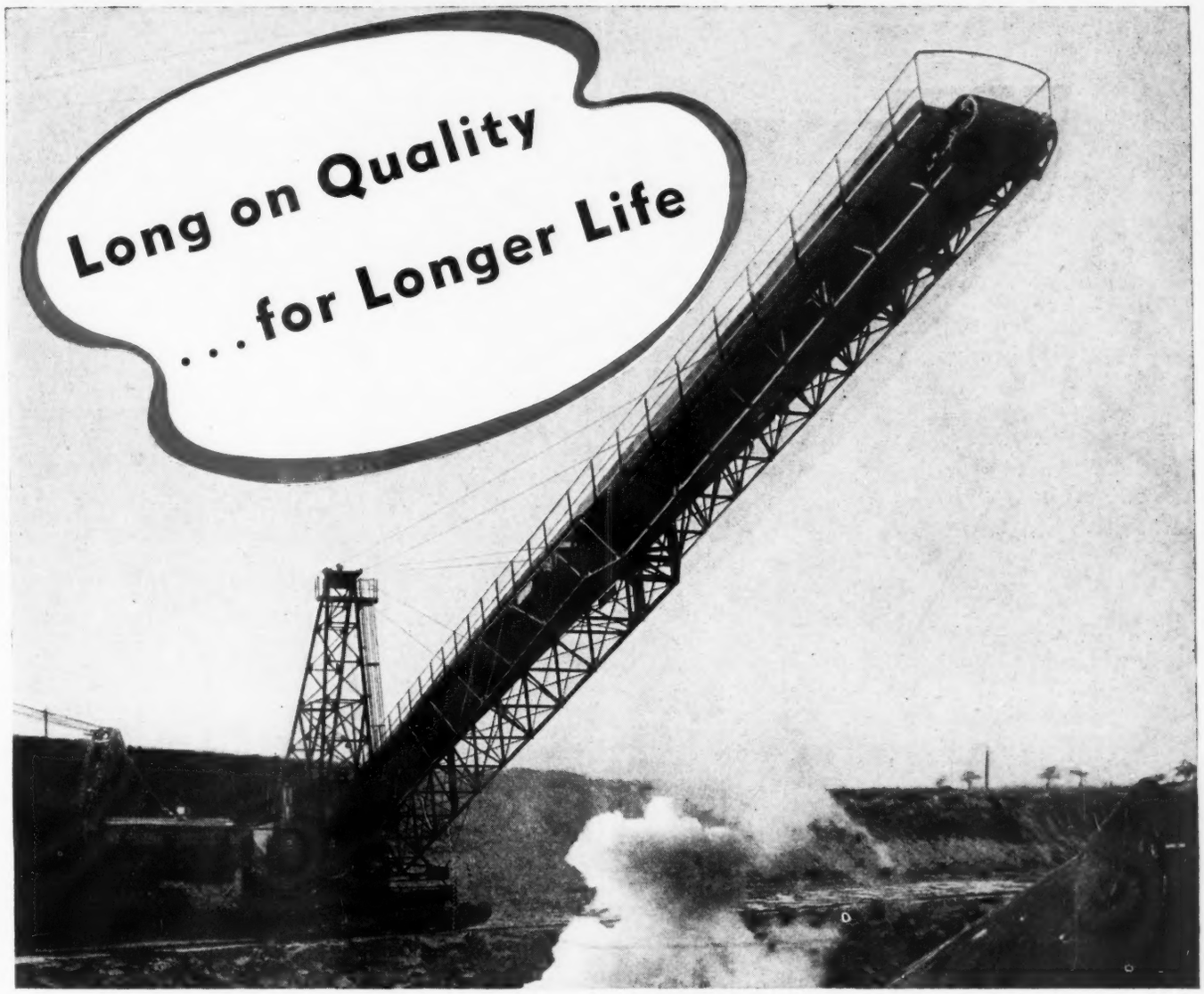
Philadelphia & Reading To Inform Public

The Philadelphia & Reading Coal & Iron Co., Pottsville, Pa., has launched a far-reaching public relations program in the newspapers of the southern anthracite field. The action is aimed at informing the public of the company's role in the general economy of the area and explaining the company's policy and service to its employees and the public. Eight daily and three weekly newspapers are being used. On days when the newspaper copy is published, the company's daily radio programs, broadcast over two local stations, are especially prepared as tie-ins. A cartoon character called "P. & R. Pete" is being widely used in the advertising copy.

•

Correction

In the article, "Pinning Machine Readies Coal for Loading," *Coal Age*, September, 1947, p. 108, the location of the United Iron Works Co., manufacturers of the machine, was inadvertently listed as Pittsburgh, Pa., whereas the correct address of the company is Pittsburg, Kan., and it should have been so reported.



MANHATTAN CONVEYOR BELTS

The huge traveling stacker shown here carries a 190′ boom equipped with a 54″ Manhattan Conveyor Belt. It delivers 800 tons of overburden per hour. Baked by summer sun, glazed by winter ice, it stands the gaff the year around. Manhattan engineers in rubber help design many conveyor systems by developing belt constructions that make strip operations more profitable.

Homocord—the belt with "Rippling Muscles"

. . . is the outstanding advance in conveyor belt design. Engineers who understand its unusual shock *cushioning* characteristics, *easy troughing, tireless flexing life* and rugged *wearing qualities* compare Homocord construction with the *rippling muscles* of a wrestler or boxer . . . It's also *mildew-proofed*, as are all Manhattan Conveyor Belts.

Belts made by Manhattan are better because they are made by the Conveyor Belt Pioneers. Write for Bulletin No. 6862C.

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RAYBESTOS-MANHATTAN INC.

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MANHATTAN RUBBER DIVISION **PASSAIC, NEW JERSEY**

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MOTOR BRUSHES

MEET EVERY TEST

The *right* brush for the *right* motor or generator in the *right* place. There is no such thing as a standard brush. Identical motors or generators often do not give identical performance. Brushes must be selected in accordance with the conditions under which the machine operates. Call on our research staff for a solution to your brush problems.

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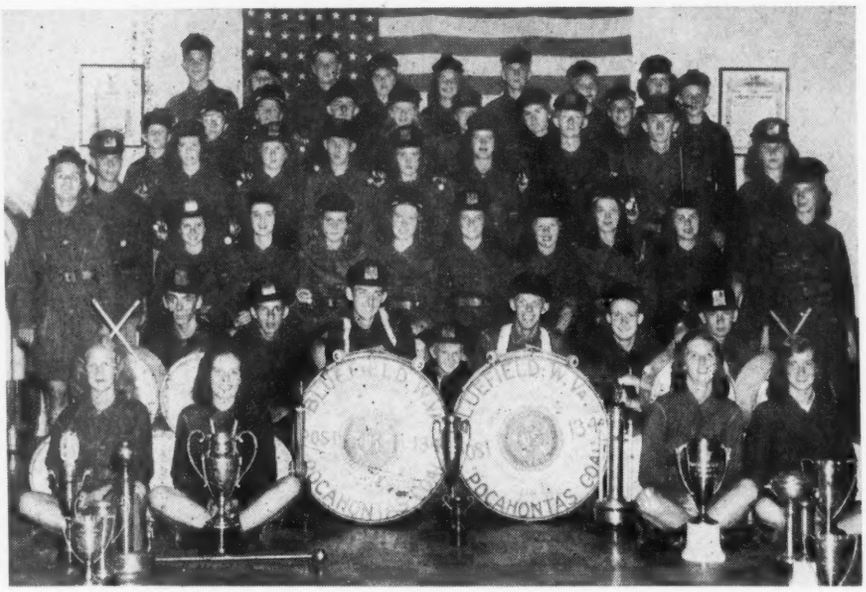


Pocahontas Youngsters Win Applause in New York

Fifty husky boys and girls from 13 to 18 years old who make up the Bluefield, W. Va., Drum & Bugle Corps marched with the Bluefield Legion Post in two American Legion Convention parades in New York City in August and won the acclaim of bystanders as the only group from any mining state to parade as mine youngsters. In the first march, which swung down New York's Eighth Avenue at night, the boys and girls were star performers with their mine apparel—blue-denim suits, hard hats and regulation headlamps. In the final parade up Fifth Avenue, they wore cream-and-gold dress uniforms and yellow-plumed hats. Earlier, Deputy Mayor John J. Bennett greeted the youngsters on the City Hall steps, where he was given a 25-lb. lump of Bluefield coal wrapped in cellophane and tied with a bright red ribbon.

Coal To Remain King, Says Power Expert

Vast new industries 50 years hence still will depend on coal as a source of power, according to C. A. Powell, assistant to the vice president, Westinghouse Electric Corp., who spoke recently to members of the Rocky Mountain Electrical League. Citing new developments in liquification and gasification of coal, as well as world reserves of coal sufficient for at least 1,000 years, Mr. Powell predicted revolutionary changes in handling and burning coal to be brought about by immense processing plants, each capable of handling 10,000,000 tons a year and each costing $100,000,000 or more. Half the output of these plants, he said, will be required to make up the deficit of gasoline and natural gas by the year 2000.

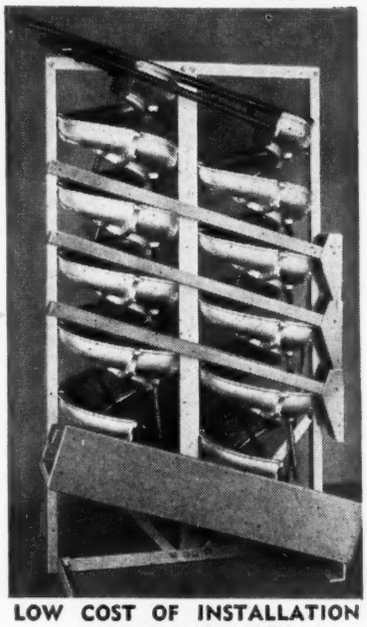
•

Pennsylvania to Seal Abandoned Mines

Pennsylvania's program to seal abandoned coal mines will be centered in Ebensburg, Cambria County, at the branch office of the State Department of Mines. The state has appropriated $1,090,000 for the work. Divisional offices will be located in Johnstown, Clearfield, Confluence and Clarion. Arthur Neale, of Crafton, is chief draftsman.

HUMPHREYS SPIRAL CONCENTRATOR

FOR CLEANING FINE COAL



LOW COST OF INSTALLATION
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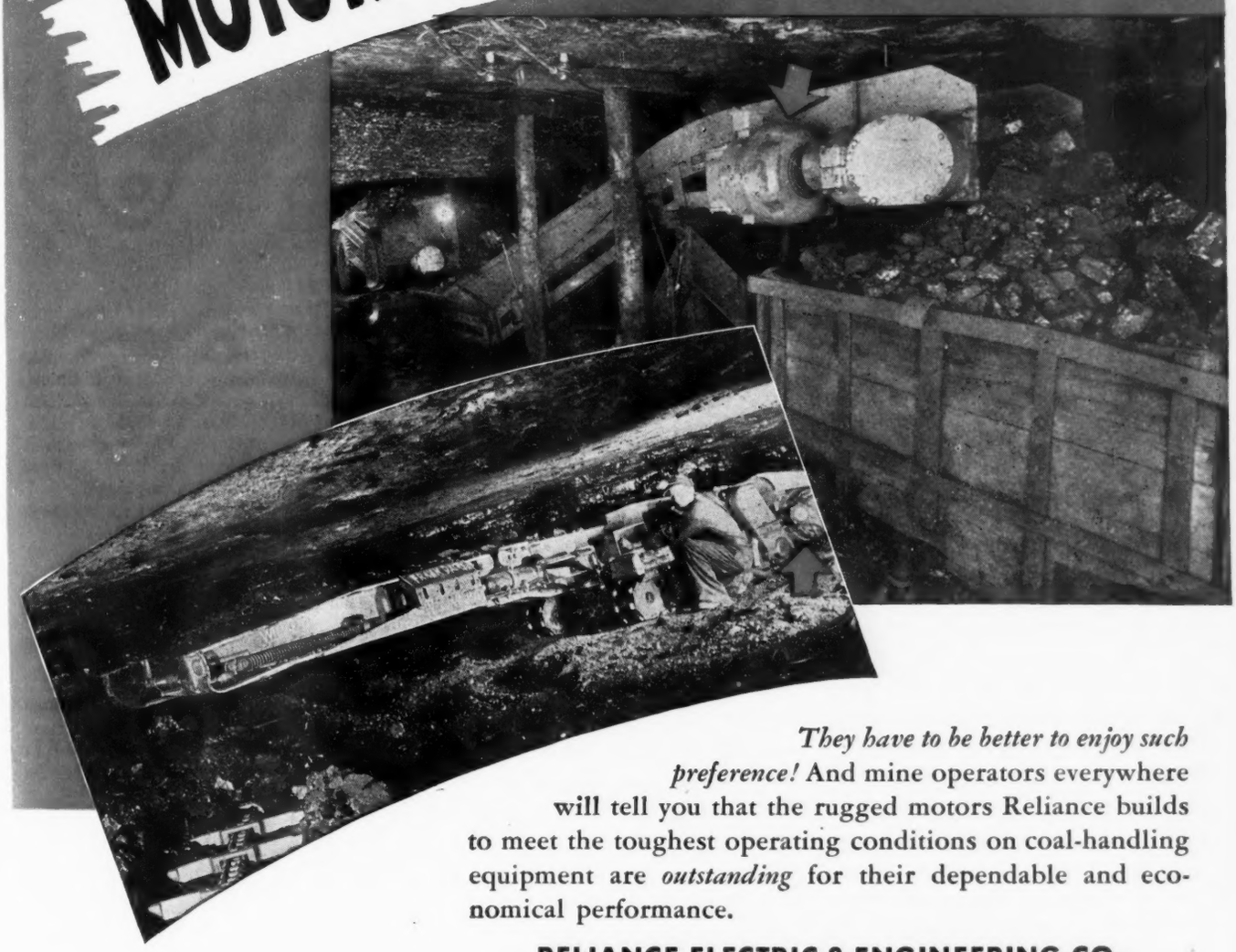
70% of all mechanically-mined U. S. Coal is handled by machines with

MOTORS *built by* RELIANCE



They have to be better to enjoy such preference! And mine operators everywhere will tell you that the rugged motors Reliance builds to meet the toughest operating conditions on coal-handling equipment are *outstanding* for their dependable and economical performance.

RELIANCE ELECTRIC & ENGINEERING CO.

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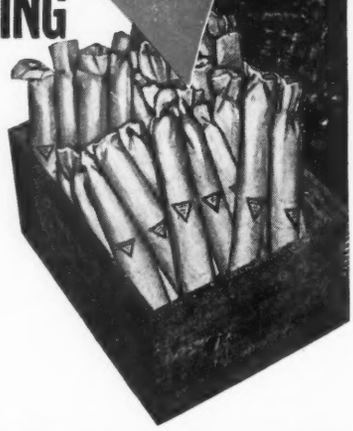
RELIANCE A·C D·C MOTORS

"Motor-Drive is More Than Power"

KEEPS DUMMIES SAFE
from BREAKING and SPILLING

High wet strength and safety-seam for double safety



Blasting procedure is streamlined with dummies made with Seal-Tite Tamping Bags. Labor, time and cost is reduced . . . A supply of dummies is quickly and simply made up at one time — and stored underground, safe from breaking and spilling—in Seal-Tite Tamping Bags.

Under humid conditions, the *high wet-strength* chemically-processed Sealtite kraft won't tear or break—and the safety-seam won't open.

They're *tough*, too—they can stand the gaff in rough handling.

SEND FOR SAMPLES TO TRY OUT

Of course, you'll want to put them to the test. Send for free samples of Seal-Tite Tamping Bags in the sizes you want or we'll send an assortment of sizes—Just write!

Tamping Bag Co.

**212 SO. THIRD ST.
MT. VERNON, ILL.**

Consol. Stages Safety Contest

With the 207 mine at Jenkins winning first place in safety, the 214 mine at McRoberts winning first place in mine rescue and the colored team at the 214 mine copping honors in safety methods, the Consolidation Coal Co. (Ky.) held its annual safety contest at the city park in Jenkins, Ky., Aug. 30. A. D. Sisk, secretary of the Elkhorn-Big Sandy Mining Institute, Pikeville, Ky., attended the meet, which was witnessed by hundreds of miners and their families. Other Consolidation mines represented at the contest were those at Closplint and Van Lear.

•

Seven Special Mine Inspectors Named

Appointment of seven special inspectors as a step toward better cooperation with federal officials in enforcement of safety regulations in coal mines was announced by Arch J. Alexander, chief, West Virginia Department of Mines, Aug. 28. Duties of the new appointees began on Sept. 1. The mines chief named the following: Cecil Constable, Fairmont, northern division; Thomas Gates, Flemington, central division; Rank Simms, Fayetteville, New River division; J. A. Staton, Sophia, Winding Gulf division; Elmer Farmer, Caretta, Pocahontas division; Edward Stuckey, Ethel, Logan-Mingo division; and Warren Fish, Sharon, Kanawha division.

•

Kansas Prison Mine Closed After 68 Years

The Kansas State Penitentiary's coal mine at Lansing closed operations Aug. 23 on orders from Gov. Frank Carlson, who had been authorized to shut down the mine when a committee of the last legislature found the operation to be uneconomic. The mine had been producing coal for 68 years. Reasons for closing the mine were given as follows: high cost of wages for civilian help, an uneconomically thin seam of coal, and the high cost of replacing outworn ventilating and operating equipment.

•

Utah Moves Toward Better Use of Coal

First tests of a new coking briquet made of powdered Utah coal with pitch added as a binder are being made at the University of Utah, according to an announcement by J. J. Hamilton, director, Utah Engineering Experiment Station, and C. S. Wolf, research associate. Aim of the tests

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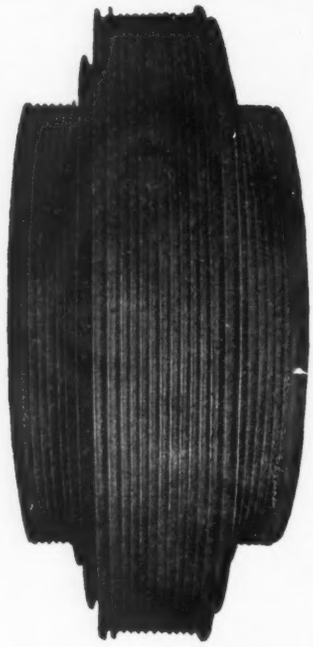
"Raising EFFICIENCY" "Lowering OPERATING COSTS"

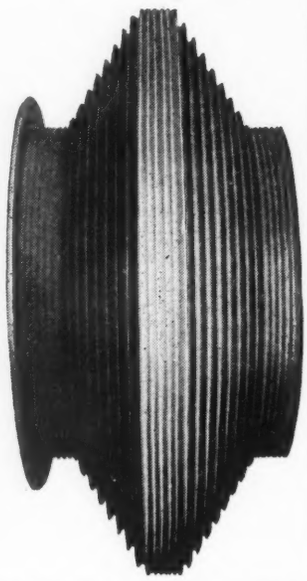


Designed after careful time studies of hoisting cycles and practical engineering experience, they have now been proved by years of outstanding performance. Long life is assured by heavy duty construction and unusual rigidity.

Holmes' Winding Drums are designed and custom built in a wide range of sizes and styles, to meet your particular requirements.

SINGLE CYLINDRO CONICAL DRUM
8 FOOT TO 12 FOOT

DOUBLE CYLINDRO CONICAL DRUM
8 FOOT TO 12 FOOT



SINGLE CONICAL DRUM
6 FOOT TO 11½ FOOT

Listed below are a few examples of the tonnages being accomplished with Holmes' Winding Drums

Cars Average	Per Hr. Max.	Coal Per Car	Lift	Power
250	255	7000 lbs.	412 ft.	Electric
250	255	7000 lbs.	462 ft.	Electric
255	260	6800 lbs.	422 ft.	Electric
200	215	6500 lbs.	500 ft.	28″ x 42″ Steam
207	220	6000 lbs.	500 ft.	24″ x 42″ Steam
210	225	5300 lbs.	475 ft.	24″ x 36″ Steam
214	240	6000 lbs.	365 ft.	24″ x 36″ Steam
180	193	8000 lbs.	563 ft.	26″ x 42″ Steam

ROBT. HOLMES & BROS., INC.

DANVILLE, ILLINOIS

is to increase the industrial usefulness of coals produced in Utah, Colorado and Wyoming, especially in the steel industry. The new product now under test is made by powdering the coal, increasing its density and adding pitch. Small briquets, about 2 in. square, already have passed some tests for coking strength and plans are under way to enlarge the size of the briquet to make it more suitable for steel-making.

Earlier, in August, the Utah Chemical & Carbon Co. announced that a new $1,400,000 smokeless fuel and coal byproducts plant would be erected on a 22-acre tract near Salt Lake City. When completed, the plant will process 400 tons of coal a day, turning out a variety of byproducts such as plastics, oils, chemicals, varnish, aspirin, nylon, etc. A new organization, the Utah Chemical & Carbon Co. is headed by W. M. Russell and L. W. Phillips, underwriters; H. W. Monahan, vice president for operations; and Grant MacFarlane, Mrs. A. C. Lund and Arthur MacFarlane, directors.

•

Bureau of Mines Reports On Old Ben Disaster

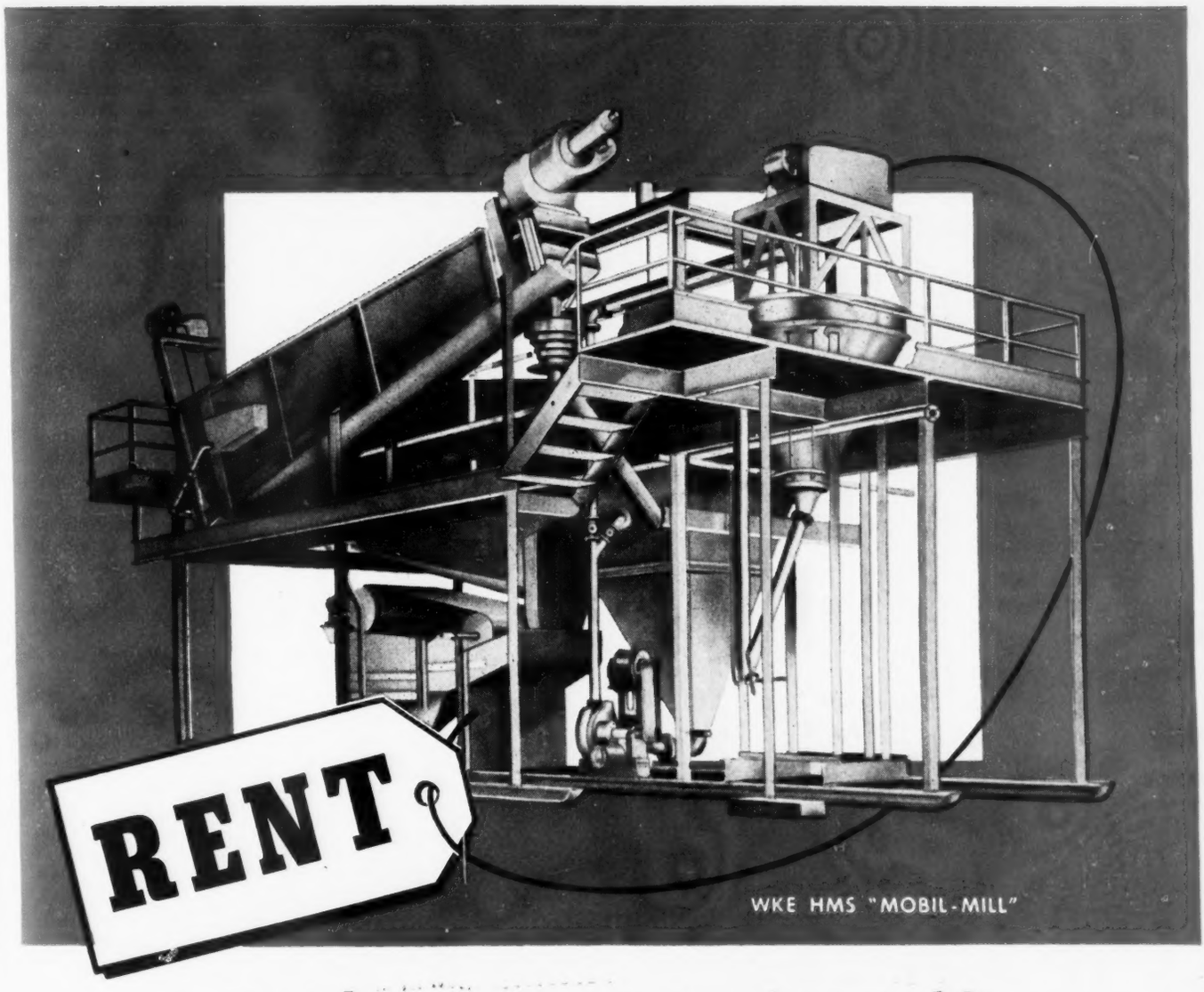
Ignition of methane by an electric mine locomotive may have caused the explosion that killed 27 men in the Old Ben Coal Corp. No. 8 mine at West Frankfort, Ill., on July 24, according to a preliminary report released by the U. S. Bureau of Mines. The source of the ignition could not be determined definitely but the Bureau's inspectors cited evidence that the gas was ignited by an arc or spark from a gathering locomotive. However, they did not rule out the possibility that an employee smoking underground may have set the blast.

The inspectors' report commented in part as follows:

"It was concluded by the Bureau men engaged in the recovery work and investigation that some accumulated gas had been forced into the active working area, or that gas had accumulated in the working section due to an extended interruption of the ventilating current, where it was ignited by a spark or an arc from the gathering locomotive, or possibly by one of the workmen smoking. . .

"The outstanding lesson to be learned from this disaster is that the practice of working places adjacent to open, abandoned sections where gas may accumulate is extremely dangerous. Abandoned workings should be ventilated properly and inspected frequently, or they should be sealed. . .

"Where single doors are used to control ventilation, all precautions should be taken to see that the doors are not kept open for an extended period of time. It is of paramount importance that officials in a gassy mine keep their flame safety lamps



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HEAVY MEDIA SEPARATION PLANT

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Take advantage of "Mobil-Mill" profit possibilities with one of these three financial plans:

1. **MONTHLY RENTAL.** Use this plan when initial capital investment is not justified.
2. **RENTAL/PURCHASE OPTION.** Use this plan when you desire to prove, with actual results, the net returns that can be gained from capital investment. A large portion of the rent is applicable to the purchase price when the option is taken up.
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HMS "Mobil-Mill" is prefabricated for ease of erection and pre-engineered for balanced pulp flow. Now, mass production techniques developed by WKE engineers introduce new equipment and milling economies to the mining industry at lowest initial cost. "Mobil-Mill" is ideally suited for base metals, non-metallics, coal and wherever the HMS process is applicable.

TWO SIZES

5-FOOT CONE PLANT

- 5 to 15 TPH Cone Feed

7-FOOT CONE PLANT

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HELPS KEEP SOLIDS OUT OF PACKING!

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New Type R Slurry Pump

Takes its suction from drive side only!

If the newest Morris Type R Slurry Pump had no other feature but this one . . . it still would be the most outstanding pump on the market.

Since the packing is under suction or positive head pressures only, it is not subject to the high stuffing box pressures typical of conventional pumps. Therefore, it is not vulnerable to severe wear and tear of abrasive solids. Packing troubles are at an absolute minimum. But this is just one of many Morris features which mean . . .

Longer Service With Less Trouble

- **Easily dismantled** — Impeller and shaft sleeve can be renewed without disturbing suction and discharge piping or bearings.
- **Simple in design** — The Morris Slurry Pump has no internal studs and bolts . . . no troublesome joints and fits.
- **Interchangeable shell** — Suction and discharge nozzle can be swiveled to almost any position. Shell changed for either right or left hand rotation.
- **Other features** — The shell is not subject to high stress. Power requirements are surprisingly low. Operates equally well under vacuum or positive head. Can be used as a booster pump.

Easy to install! Easy to dismantle! Easy to maintain!

The Morris Type R is specifically engineered to handle mixtures containing ore concentrates . . . tailings, slag, and residue from filters and classifiers. Operates on all types of caustic or acid mixtures containing abrasives or solids.

MORRIS MACHINE WORKS
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MORRIS *Centrifugal Pumps*

with them at all times and make frequent examinations for gas in the working places. The practice of smoking in a gassy mine, surreptitiously or otherwise, must be discontinued if mine disasters are to be avoided. Searching employees for smokers' articles before they enter the mine should be considered by the men to be an essential safeguard, rather than a violation of personal rights, and it should be done at all mines where smoking underground is prohibited."

•

Illinois Research Progress Reported

New markets for 1,000,000 tons of Illinois coal annually for making metallurgical coke for the steel industry were predicted as a result of experiments started four years ago by the Illinois State Geological Survey, in affiliation with the University of Illinois, according to a statement Sept. 9 by M. M. Leighton, chief, State Geological Survey. The experiments, started during the war to reduce shipments of Appalachian coal to Chicago and St. Louis steel industries, show that southern Illinois coal can be successfully blended with eastern coal to make metallurgical coke.

Also, Northwestern University's Technological Institute, Evanston, Ill., announced a new method of removing impurities from coal on Sept. 8. The new process, utilizing a Humphreys spiral concentrator and a hydraulic classifier especially fitted by Donald A. Dahlstrom, instructor in the institute's chemical engineering department, lowers ash content, decreases sulfur and facilitates treatment of fines.

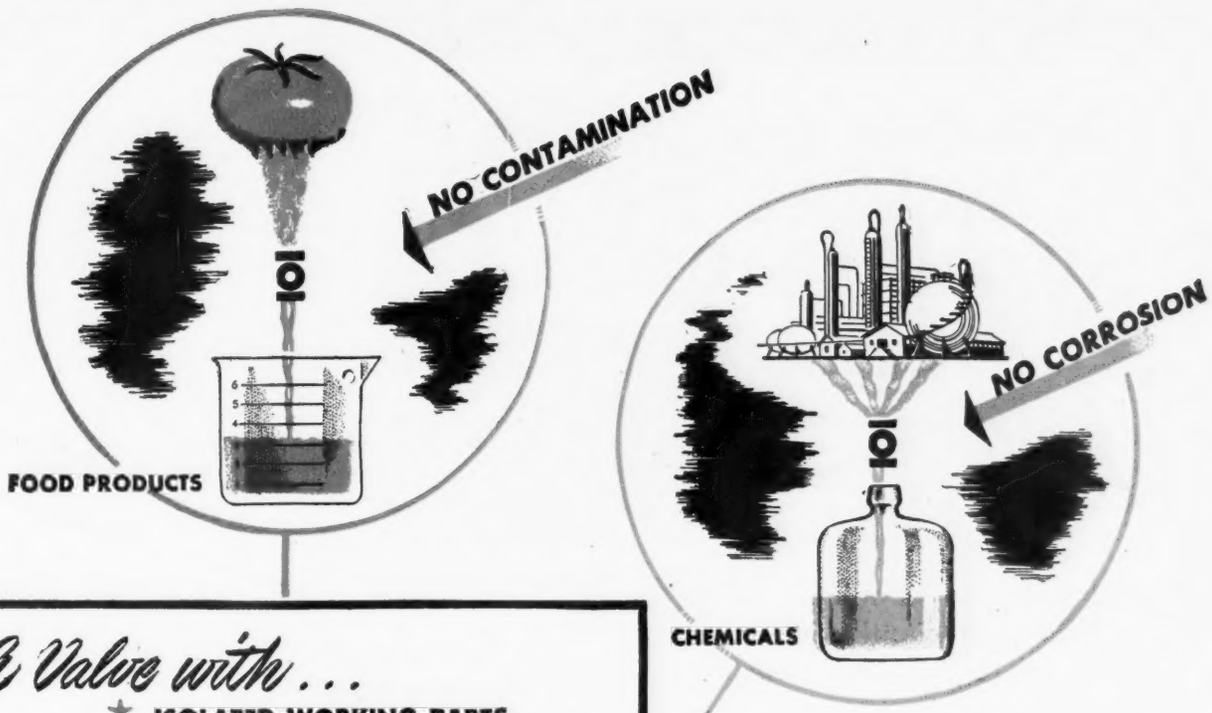
Elsewhere in Illinois, Harold L. Walker, chairman, department of mining and metallurgical engineering, University of Illinois, and acting director, Illinois Department of Mines and Minerals, announced that a state laboratory to analyze samples of coal-mine air would be ready for use about Nov. 15.

•

Canadian Miners to Terminate Contracts

Threats of a general strike of nearly 10,000 coal miners in western Canada loomed as officers of District 18, U.M.W., gave notice Sept. 4 that the contract now in force will be terminated Nov. 1. The miners' demands were not announced but there were indications that wage increases and a larger welfare-fund levy on tonnage would be asked. The present agreement went in effect early in October, 1946, and was to remain in force until March 31, 1948.

Meanwhile, officers of District 26, U.M.W., in Nova Scotia, stated that



A Valve with . . .

★ **ISOLATED WORKING PARTS**
★ **CORROSION-PROOF LININGS**
★ **STREAMLINED FLOW**

GRINNELL-SAUNDERS DIAPHRAGM VALVES

● The flexible diaphragm isolates the working parts of the valve from the fluid, preventing contamination, and permits streamlined flow plus positive closure even with suspended solids.

A selection of diaphragm materials and also body linings of glass, porcelain, lead, rubber or synthetics protects against corrosion.

- No packing glands to demand constant attention. Non-rising stem eliminates breakage . . . sealed for protection from dust, weather and corrosion.
- Working parts completely isolated from the fluid. No sticking, corroding or clogging to interfere with easy operation and tight closure. No contamination from valve lubricants.
- Compressor and finger plate combine to support the diaphragm in all positions.
- The large area of contact of the diaphragm on the seat, plus the resilience of the diaphragm, permits positive closure even when foreign matter is trapped.
- No metal-to-metal seats to become damaged or wire-drawn.
- No refacing or reseating is required.
- Streamlined passage without pockets reduces friction to a minimum and prevents accumulation of sludge and foreign solids.
- The valve body—the only metal that could contact the fluid—can be completely lined with glass, porcelain, lead, rubber or synthetic compounds (flange type only) to suit service requirements.

Write for catalog describing Grinnell-Saunders Diaphragm Valves—standard and special types.

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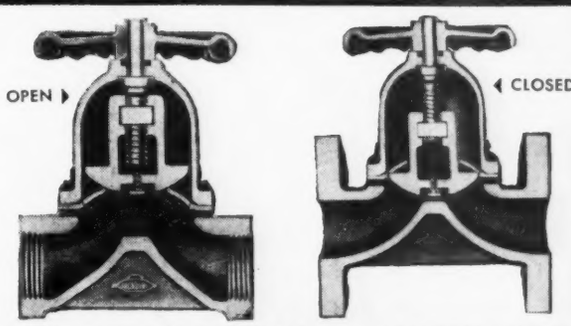

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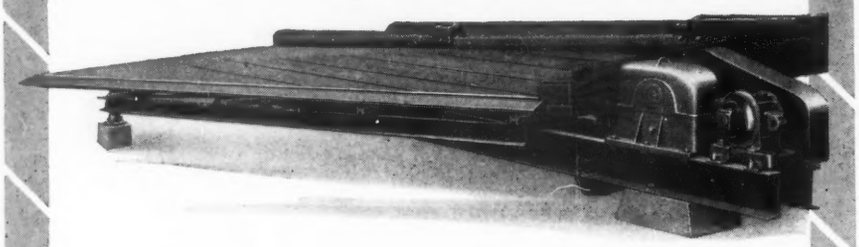
WHENEVER **PIPING** IS INVOLVED

SuperDuty Coal Washing TABLES DO DOUBLE DUTY

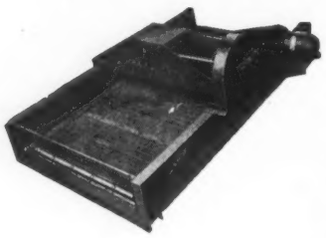


Not only do SuperDuty tables wash your coal most efficiently, but they separate from the coal any foreign substance of different specific gravity.

The separative action is substantially improved over conventional methods by SuperDuty's exclusive diagonal deck which places approximately 75% more working riffles in the natural path of the separative action. This so fans out the bed that accurate division of products is assured.

So efficient is the SuperDuty that many operators are finding it profitable to process low grade deposits, culm banks or waste piles from other coal cleaning machines.

For full information, write for Bulletin 119.



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the 13,000 miners in that area should ask for a $1.10 increase per day after expiration of the present contract Dec. 31. In addition, union spokesmen claimed that the 40c a day increase offered miners in the June strike settlement was "well within the grasp" of the miners. The 40c increase was offered by the operators, effective Dec. 1., if production increased to prewar levels.

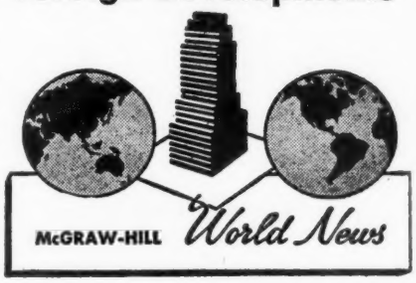
•

Ten-Year Plan Urged For Canadian Coal Mines

A 10-year program of expansion for Canadian coal mines was proposed by provincial mines ministers following a four-day conference that ended July 10 at Ingonish, Nova Scotia. The report included recommendations for improved preparations, proper grading, transportation subsidies and an annually increasing supply.

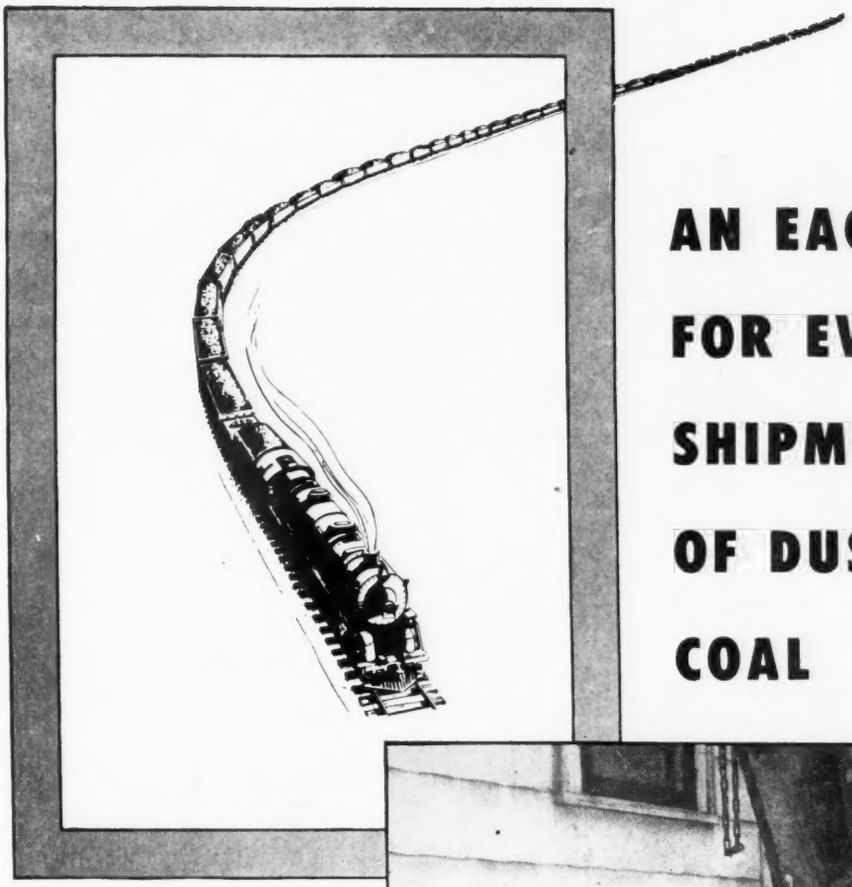
•

Foreign Developments

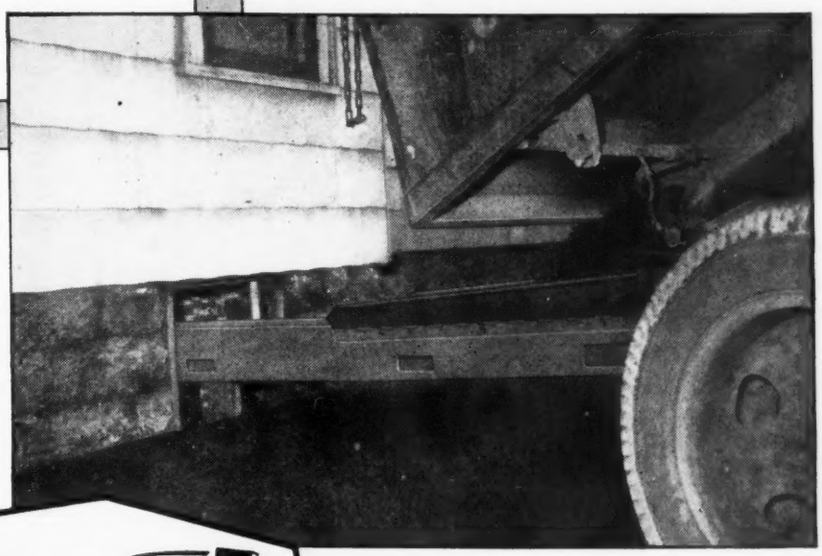


LONDON—Ending five weeks of idleness, miners in the Grimethorpe pit in Yorkshire returned to their jobs Sept. 15 and thus led an estimated 40,000 sympathy strikers in 54 other mines in the area back to their work. The strike, together with sympathy stoppages, was estimated to have cost Britain about 600,000 tons of coal since the walkout began on Aug. 11. Following the back-to-work movement, the National Association of Overmen, Deputies and Shotfirers told the National Union of Mineworkers that they had requested their Yorkshire association to withdraw a strike notice, issued Sept. 12, to protest anomalies in the five-day week. Foremen claimed that their deputies earned more than foremen themselves and charged that they did not benefit from the five-day week, as did other mine employees. The strike notice was withdrawn when the National Coal Board gave assurances that negotiations would follow.

Earlier, the National Coal Board announced, on Aug. 26, that Britain was ready to spend huge sums in modernization of the mines in all 49 coal-mining areas. The plans include a reorganization of the pits, the provision of new equipment, perhaps a grouping of several pits and "the introduction of the latest continental methods of improving production."



AN EAGER MARKET FOR EVERY SHIPMENT OF DUST-PROOFED COAL



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The permanent effect of properly treated dust- and freeze-proofed coal is preferred by most industrial and domestic consumers. Oil treated coal handles better, stores better and burns better. Only a minimum of equipment is necessary for proper application. We'll be glad to give you all the facts.

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Wherever Coal is Mined
WOOD'S
BIG FIST
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SPEED Production
BIG FIST COAL SHOVELS, designed and manufactured by shovel specialists, are the first choice of experienced miners, are always specified by smart buyers who demand the best.
BIG FIST COAL SHOVELS speed production, because their generous size and fine precision balance enable miners to shovel more coal with less effort and fatigue.
A FINE QUALITY PRODUCT OF
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SPECIALISTS IN SHOVELS, SPADES, SCOOPS
the blade lies flat on ground and does not rock —the edge of the blade slides into the coal rather than digging under it.
The Wood Shovel and Tool Company, Piqua, Ohio

GERMANY—A dozen recommendations growing out of the United States-British talks on ways and means of increasing Ruhr coal output were submitted at the conclusion of the conferences in Washington, Sept. 10. The recommendations range from concentration of authority in German hands to immediate purchase of steel and other materials to repair mine machinery and equipment. The recommendations still are subject to review by higher levels in Washington and London but it is felt they will be accepted with little if any change. A brief summary of the proposals follows: (1) establishment of a German Coal Management with full responsibility for coal production; (2) immediate action, with more steel plus about $25,000,000 for repair materials, to arrest deterioration of equipment; (3) large financial assistance to permit imports of essential raw materials to push production up to 400,000 tons daily; (4) further installation of the coal plough and the cutter-loader, together with further study by American engineers to speed mechanization; (5) top priority for steel and other materials to repair locomotives and coal cars and further use of trucks for short hauls; (6) increased use of the ports, barges and tugs of the Low Countries; (7) more effort to meet the basic daily ration of 1,500 calories and the miners' special ration of 2,500 additional calories; (8) high speed for the current two-year housing program for miners and their families; (9) better wages paid in a stabilized currency; (10) social security measures to improve the lot of miners; (11) an increased price for coal within Germany; and (12) further study of British proposals to nationalize the mines before any action is taken along those lines.

Export prices for coal mined in the Anglo-American zone have been brought closer into line with world market prices under a new schedule that became effective Sept. 1. The new prices represent an average boost of 50 percent but still are considerably below the prices of coal exported from the United States to Europe. German mines will continue to be paid in German marks at controlled prices, which will necessitate subsidies to offset operating losses.

Earlier, on Aug. 25, British authorities in the Ruhr Valley disclosed that coal production in the Ruhr had reached a new postwar record with production of 242,644 tons Aug. 22.

PARIS—Heavy dependence on western Germany as well as Poland and other eastern countries in the Soviet bloc to make up predicted coal deficits for the next four years by the 16 nations attending the European economic conference was shown in the report of the technical committee on fuel and power, released Aug. 27. The report reflected the desire of the conferees to reverse the present role of the United States as the principal

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B. Place valves correctly in the line.
C. Choose Jenkins Valves for lifetime economy.

THIS SIMPLE ABC FORMULA, plus intelligent treatment and care of valves, is paying extra dividends in valve economy throughout industry.

When you choose Jenkins Valves, you can be sure they'll last far beyond the normal life expectancy of valves, even in the toughest service. You also get the expert advice of top-rated valve specialists, Jenkins Engineers, on any question of valve selection or placement.

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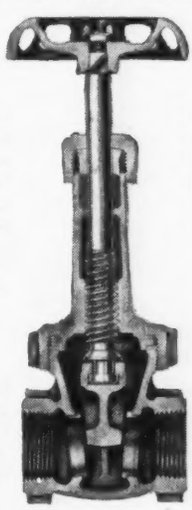
Sold Through Reliable Industrial Distributors Everywhere

JENKINS FIG. 270-U BRONZE GATE VALVE

Sets a new standard for Valve Economy



Monel Seat Rings Expanded in Body
Monel metal used is about 2½ times the hardness of valve body bronze — gives exceptional resistance to erosion and corrosion.

Large Spindle Threads Last Longer
Reduce wear to a minimum and insure easy operation. Spindle metal is hard, tough manganese bronze.

Exceptionally Rugged Body, Bonnet, and Bonnet Ring Add Strength

Deep Stuffing Box — More Packing
Keeps packing tight with less friction.

Bronze wedge seats against MONEL seat rings expanded into body. Easily replaced, slip-on wedge takes wear. Proved in toughest services. the best combination to beat wear, reduce care. Write for complete details.

ONE OF OVER 600 *EXTRA VALUE* VALVES MADE BY JENKINS *VALVE SPECIALISTS*

You cut costs . . . and save time

when you use

DUFF-NORTON JACKS

for your Mining Operations

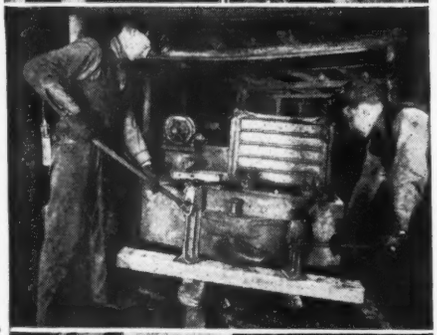
There is a Duff-Norton Mining Jack for every job in and around your mine, that will help speed up your operations, cut costs, make work easier and safer. Here are a few . . .

MINE ROOF AND TIMBERING JACKS

Designed for safe and fast operations, these jacks serve as sturdy supports until permanent timbering is in place, or as temporary props when setting loading or conveyor machinery. Available in heights to suit the need.

AUTOMATIC LOWERING JACKS

For rerailing mine locomotives, repairing heavy mine cars and hundreds of other uses around the mine. Available in capacities from 10 to 25 tons, for every requirement.



JOURNAL JACKS

These jacks are ideal for use in low heights and cramped areas, where high lifting capacities are required. Made in six sizes, from 10 to 50 ton capacities.

Write today for Catalog 203, which gives complete data on jacks illustrated and the many others available for the mining industry.

DUFF-NORTON JACKS

THE DUFF-NORTON MANUFACTURING CO.

PITTSBURGH, PA.

supplier of imported coal because of the heavy drain on dollar balances. In its estimates, the committee scaled down imports from the United States progressively from 1948 to 1951 and boosted expectations from Poland until 1951, when that country is expected to make up 75 percent of Europe's estimated 39,000,000-ton deficit for that year. At the same time, shipments from the British and American zones of Germany would rise from 86,000,000 tons in 1948 to 121,000,000 tons in 1951.

BELFAST—Geologists and an unnamed mining company are reportedly examining the prospects for coal mining in various parts of Northern Ireland and the Minister of Commerce has revealed that, according to advice from the geologists, there are promising deposits in the Coalisland and Lough Neagh area. The minister stated that investigations are being continued. Northern Ireland is known to contain rich deposits of coal but the problem is whether it can be mined.

MOSCOW—Wide application of luminescent lighting in Soviet coal mines has been scheduled following successful tests of the new-type mine lamps at several mines in the Donbass, Kemerovo and Cheliabinsk coal fields. Reported to be explosion-proof, the lamp does not require the special switch-off attachments commonly used on incandescent lamps. Its starting mechanism is a transformer with large diffusion, which switches the lamp on without preheating. Initial transformer voltage of 320 to 380 volts drops to 60 volts at the electrodes after the arc discharge. The lamp is lit in one second, compared with the 30 to 60 sec. required with neon starters.

Luminescent lighting by radio-frequency current also is being developed experimentally. Lamps of this type are lit by induction through proximity to the magnetic field of a high-frequency cable. Having no wire connection, the lamp can be mounted easily on the miner's hat.

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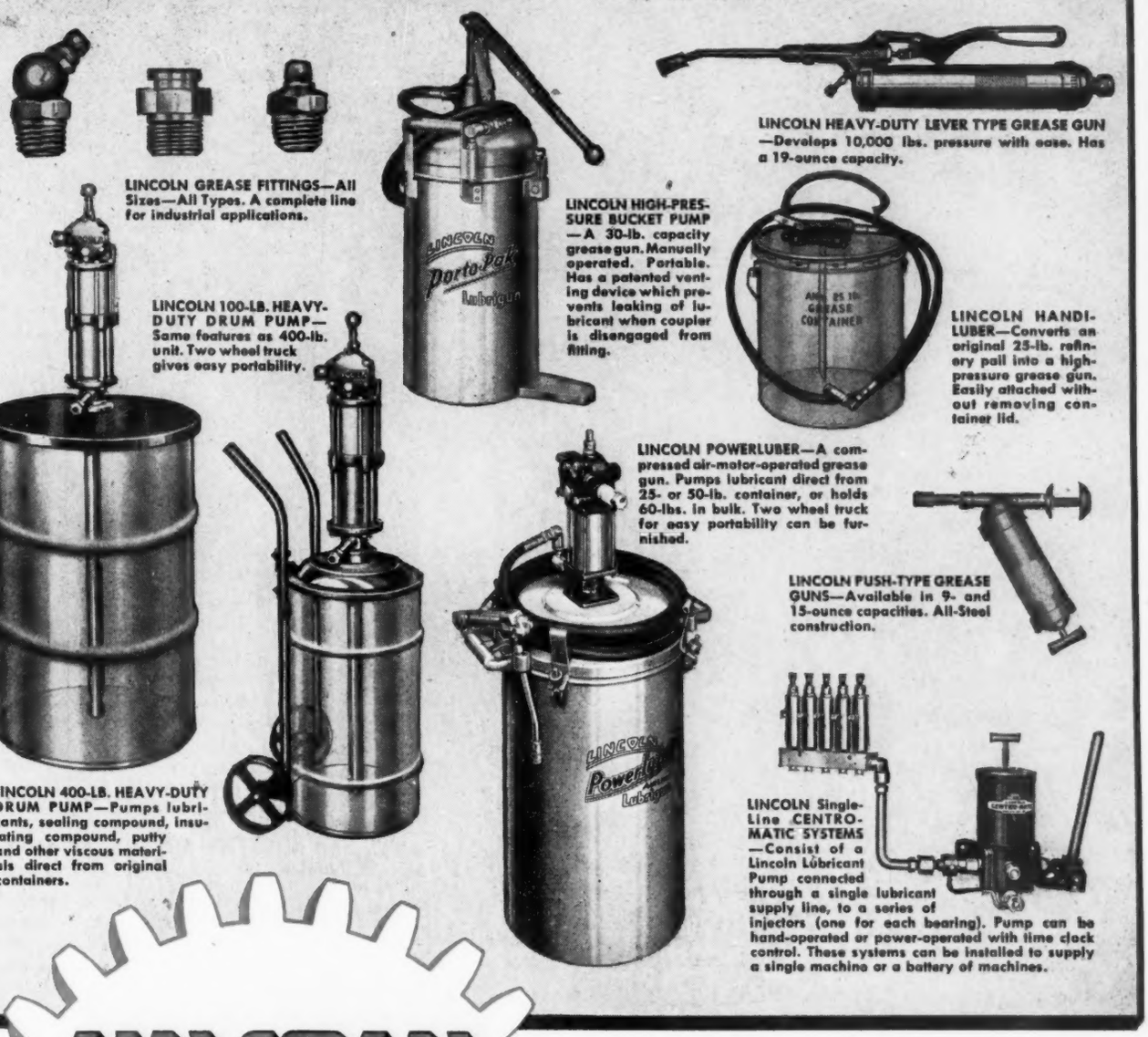
Association Activities

Central Pennsylvania Coal Producers Association and the Eastern Bituminous Coal Association, at the annual meeting, Sept. 11, at the Bedford Springs Hotel, Bedford, Pa., reelected as president, Charles J. O'Neill. Walter A. Jones was reelected secretary-treasurer. More than 125 members and guests of the organization attended the two-day meeting, the second day of which was devoted to recreational activities.

Big Sandy Elkhorn Coal Operators Association, at its annual meeting held Sept. 12 in Lexington, Ky., elected the following officers: president, B. F. Reed, secretary, Turner Elk-


LINCOLN GREASE FITTINGS—All Sizes—All Types. A complete line for industrial applications.
LINCOLN HEAVY-DUTY LEVER TYPE GREASE GUN—Develops 10,000 lbs. pressure with ease. Has a 19-ounce capacity.
LINCOLN HIGH-PRESSURE BUCKET PUMP—A 30-lb. capacity grease gun. Manually operated. Portable. Has a patented venting device which prevents leaking of lubricant when coupler is disengaged from fitting.
LINCOLN 100-LB. HEAVY-DUTY DRUM PUMP—Same features as 400-lb. unit. Two wheel truck gives easy portability.
LINCOLN HANDI-LUBER—Converts an original 25-lb. refinery pail into a high-pressure grease gun. Easily attached without removing container lid.
LINCOLN POWERLUBER—A compressed air-motor-operated grease gun. Pumps lubricant direct from 25- or 50-lb. container, or holds 60-lbs. in bulk. Two wheel truck for easy portability can be furnished.
LINCOLN PUSH-TYPE GREASE GUNS—Available in 9- and 15-ounce capacities. All-Steel construction.
LINCOLN 400-LB. HEAVY-DUTY DRUM PUMP—Pumps lubricants, sealing compound, insulating compound, putty and other viscous materials direct from original containers.
LINCOLN Single-Line CENTRO-MATIC SYSTEMS—Consist of a Lincoln Lubricant Pump connected through a single lubricant supply line, to a series of injectors (one for each bearing). Pump can be hand-operated or power-operated with time clock control. These systems can be installed to supply a single machine or a battery of machines.

LINCOLN

Lubricating Equipment

...Engineered to Protect and Increase the Productive Service-Life of Coal Mining Machinery

Bearing failure, excessive maintenance labor, wasted lubricants and accidents—troubles that so frequently cause production delays and increase "per-ton" costs can be materially reduced by positive, thorough lubrication.

To give your coal mining machinery and handling equipment maximum protection, plug these profit leaks by lubricating the Lincoln way. Regardless of the requirements, Lincoln can supply the *right* equipment, from a complete centralized system to hand guns and grease fittings, to meet your lubrication needs. A few of the many Lincoln products are illustrated and described above.

Trade mark LINCOLN and trade names—Porto-Pak, Powerluber, Handi-Luber, Centro-Matic registered U. S. Pat. Office.

Pioneer Builders of Engineered Lubricating Equipment

ASK YOUR *Lincoln* WHOLESALER

He has experienced men ready to help you with your lubrication problems and can supply your requirements. If there is no Lincoln wholesaler convenient, mail coupon for literature and complete information.

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Gentlemen: Please send me catalog on Lincoln Industrial Lubricating Equipment ☐. I would like to have literature on Centro-Matic Lubricating Systems ☐.

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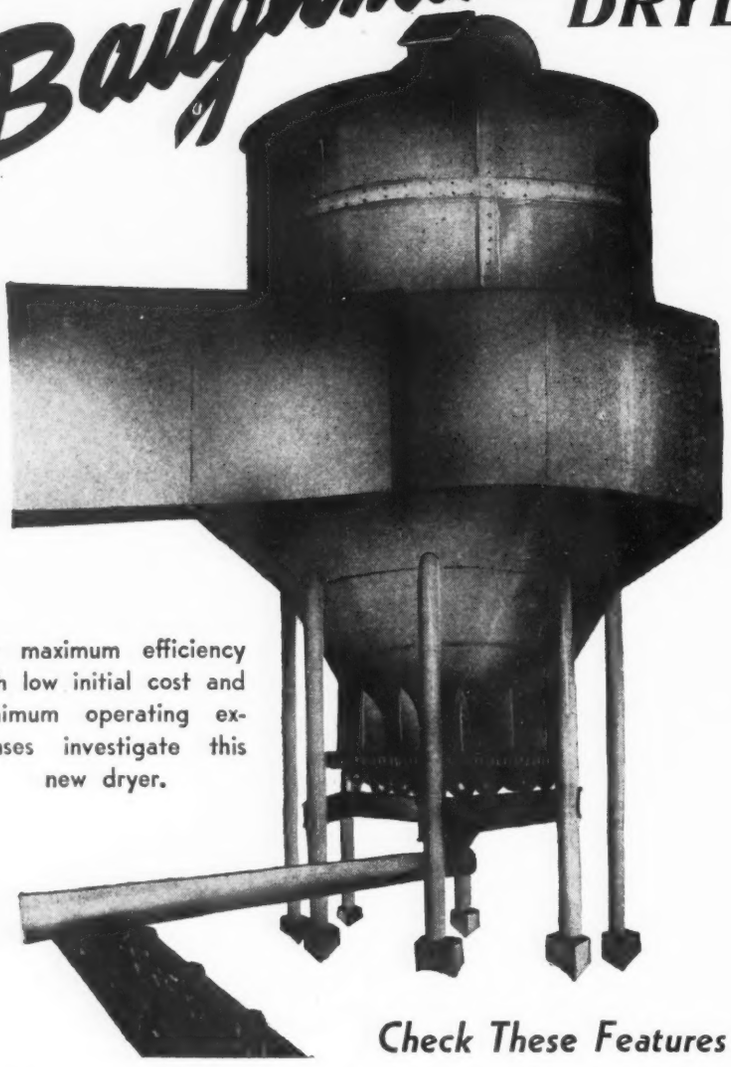
NEW! Baughman VERTI-VANE DRYER



For maximum efficiency with low initial cost and minimum operating expenses investigate this new dryer.

Check These Features

1. Degradation of product is reduced to a minimum.
2. Slow movement of coal through unit makes possible use of low temperature gases.
3. Low temperature operation prevents overheated product.
4. Lower section of dryer acts as cooling chamber, giving cooler discharge of product.
5. Vertical construction requires a minimum of floor space.
6. Uniform drying without cataracting (smooth continuous flow) eliminates need of dust collectors.
7. No auxiliary equipment required for drying fine coal as fines may be left in product being dried.
8. High thermal efficiency proven by exhaustive tests means more dry product per B.T.U. burned for heat.
9. Low initial cost.
10. Low operating cost.

Write us for further information about Baughman Verti-Vane Dryers. Our sales and technical staffs are always ready to help you solve specific coal handling problems.

ROBERT HOLMES AND BROS., INC.
DANVILLE, ILLINOIS

horn Mining Co.; vice president, W. W. Goldsmith, receiver, Elk Horn Coal Corp.; secretary, H. S. Homan, Ashland, Ky.; and treasurer, J. R. Hurt, secretary, Sandy Valley Coal Co. Harry La Viers, vice president, South-East Coal Co., and president of the association for the past ten years, was named chairman of the board of directors. Elected to the board of directors, in addition to the above officers, were the following: V. D. Picklesimer, South-East Coal Co.; J. E. Bowman, Utilities Elkhorn Coal Co.; R. A. Hedland, Utilities Elkhorn Coal Co.; J. F. Caulfield, Elk Horn Coal Corp.; S. M. Cassidy, Consolidation Coal Co. (Ky.); G. O. Tarleton, Consolidation Coal Co. (Ky.); C. D. Reed, Turner Elkhorn Mining Co.; Joseph Harris, Russell Fork Coal Co.; A. H. Mandt, Stephens Elkhorn Fuel Co.; A. P. Boxley, Coal Division, Eastern Gas & Fuel Associates; H. K. English, Clear Branch Mining Co.; W. F. Pioch, Glogora Coal Co.; Edgar Dale, Elk Horn Coal Corp.; and David L. Francis, Princess Elkhorn Coal Co.

Colorado & New Mexico Coal Operators Association has named O. F. Bridwell, Denver, secretary-treasurer, succeeding the late Frank O. Sandstrom, who held the position for twenty years.

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Preparation Facilities

Island Creek Coal Co., No. 25 mine, Delbarton, W. Va.—Contract closed with Roberts & Schaefer Co. for complete tipple and preparation plant, capacity 400 t.p.h., run-of-mine, to make standard Island Creek prepared sizes; 5x⅛-in. to be washed in Baum type jigs, ¼x⅛-in. to be heat dried in lash driers.

Island Creek Coal Co., No. 27 mine, Holden, W. Va.—Contract closed with Roberts & Schaefer Co., for duplicate of plant to be installed at Mine No. 25 (as above).

Carbon Fuel Co., Mine No. 12, Carbon, W. Va.—Contract closed with Roberts & Schaefer Co. for complete preparation plant, capacity 300 t.p.h., run-of-mine; 5x⅜-in. to be washed in Tandem-Hydro-Separator, standard Carbon Fuel sizes to be prepared.

Powhatan Mining Co., Powhatan Mine, Powhatan Point, Ohio—Contract closed with Roberts & Schaefer Co. for addition to cleaning plant, to preclean 8x¼-in. at the rate of 400 t.p.h. in Tandem-Hydro-Separators.

Simpson Creek Collieries Co., Inc., Galloway, W. Va.—Contract closed with Roberts & Schaefer Co. for unit Hydrotator to clean 40 t.p.h. of 1¼x0-in. coal.

Jones & Laughlin Steel Corp., Vesta-Shannopin Division, California, Pa.—Contract closed with F. H. Mc-

They Clear Our Path to Bigger Profits!

When it comes to stripping overburden, those Oliver "Cletrac" crawler tractors are in a class by themselves. The way those babies handle themselves in that rough going is a sight to behold. They really get us down to the seam in a hurry.

My Oliver "Cletrac" dealer was the boy who gave me the dope on stepping up production. "Look," he said, "when you're dozing or scraping off that overburden, you get an uneven load on the tractor. So you've got to keep jackknifing from side to side to overcome the uneven pull. That is, unless you've got Cletracs on the job. They have an exclusive steering principle that permits them to balance the pull of one track against the pull of the other. You can keep an offset load moving straight ahead . . . there's no wasted motion. And, they are easier and safer to handle on rough, steep and uneven ground."

He had the right angle, all right. Why we've cut our clearing time right down to the bone. The Oliver "Cletrac" dealer sure knows this stripping business. He's a good man to know!

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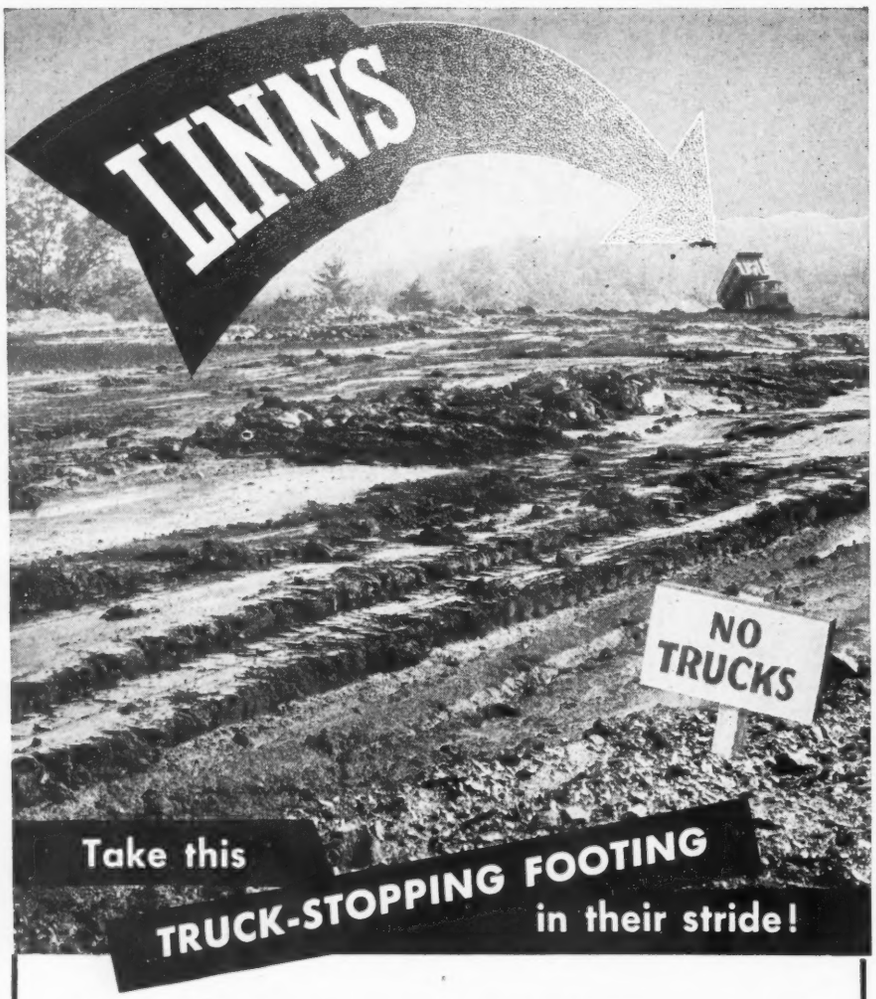


This muddy footing can't stop the LINN . . . one of a fleet working on a coal refuse disposal operation in Pennsylvania.

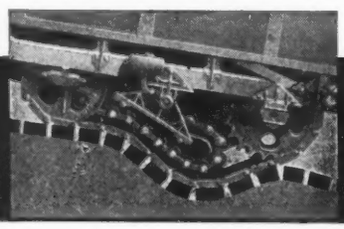
The LINN *flexible* traction unit fits itself to the footing on any job . . . it follows the terrain contour, biting in to give maximum traction over rocks, mud, clay, stumps, ice, snow or burning bone. The tracks are extremely wide insuring adequate traction and preventing "sinking in" on soft or boggy ground. LINNS carry the load—every day throughout the year!

Available with capacities from 5 to 50 tons in a variety of body styles for every type of mine haulage requirement. For specifications write to our General Sales Office, 250 West 57th Street, New York 19, New York.

THE LINN MANUFACTURING CORPORATION

MORRIS, NEW YORK

Manufacturers of Haftraks for Over 30 Years



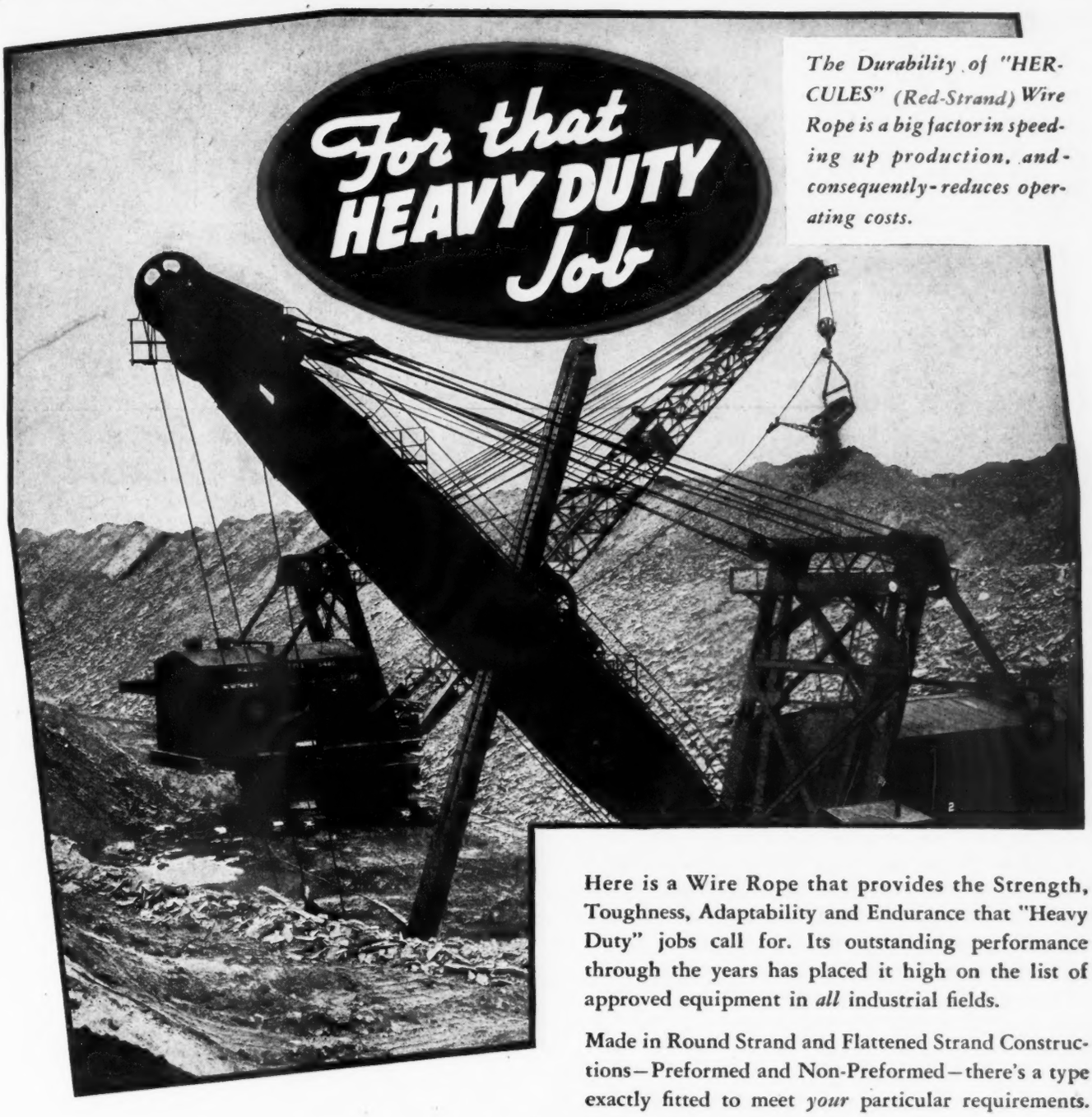
LINN HAFTRAK

CONTOUR TRACTION

Graw & Co., general contractors (Nelson L. Davis Co., designing engineers and sub-contractors), for construction of a preparation plant to serve Nos. 4 and 5 mines; capacity, 2,000 t.p.h. Coal, after crushing to 5-in., will be brought out of the mine on a belt and delivered across the Monongahela river to the new plant. The 5x¼-in. portion will be cleaned in two stages in heavy-media separators. The first stage will result in a final reject and a float-coal product delivered to a blending bin. The blended coal will be withdrawn and retreated at a lower specific gravity to yield two products: metallurgical-quality coal and steam-quality coal. The ¼x0-in. raw coal will be removed by presizing screens ahead of the heavy-media plant and sent to a separate blending bin prior to treatment in a fine-coal cleaning plant. This latter plant will consist of free-discharge launders with concentrating tables for cleaning up the middlings. The combined float from the fine-coal plant will join the 5x¼-in. metallurgical coal in a storage bin. Provision is made for loading either metallurgical or steam coal into river barges at a rate of 2,000 t.p.h. or into railroad cars—only in emergency when the river is closed—at a rate of 1,000 t.p.h.

Walter Bledsoe & Co., Saxton mine, Terre Haute, Ind.—Contract closed with McNally-Pittsburg Mfg. Corp. for complete 7-track tipple and washery, receiving 400 t.p.h. from run-of-mine belt; run-of-mine to be pre-screened at 6 in., the 6-in. plus hand-picked, 6-in.x10-mesh mechanically cleaned in one McNally Norton automatic compound washer providing separate crushing and retreatment of all middle-gravity fractions; all hand-picked bony coal will be crushed and fed to the McNally-Norton washer for recovery of coal; crushing facilities for crushing all plus 6-in. coal for retreatment in cleaning plant; all 6x10-in. coal will be pre-screened on two double-decked Allis-Chalmers "Ripl-Flo" screens for removal of 10-mesh-minus fines prior to washing. Washed coal will be classified at 3-, 2-, 1¼- and ⅞-in., the ⅞x0-in. to be further classified and dewatered at ⅜-in. and 10-mesh on Allis-Chalmers "Lo-Head" screens; the 10-meshx0 will go to settling cone, the recovered 10-meshx48-mesh to receive final dewatering in two McNally-Carpenter centrifugal dryers. Complete mixing facilities of all washed coals, together with crushing and rescreening facilities to reduce all plus 1¼-in. to 1¼-in.-minus for preparation of premium stoker grades. Alternate provisions are made for loading raw 6-in.-plus lump, 6x⅜ and ⅜x0-in.

Old Ben Coal Corp., Mine No. 9, West Frankfort, Ill.—Contract closed with McNally-Pittsburg Mfg. Corp. for complete 450-t.p.h. McNally-Norton washer addition to existing re-



The Durability of "HERCULES" (Red-Strand) Wire Rope is a big factor in speeding up production, and consequently reduces operating costs.

Here is a Wire Rope that provides the Strength, Toughness, Adaptability and Endurance that "Heavy Duty" jobs call for. Its outstanding performance through the years has placed it high on the list of approved equipment in *all* industrial fields.

Made in Round Strand and Flattened Strand Constructions—Preformed and Non-Preformed—there's a type exactly fitted to meet *your* particular requirements.

Your inquiries are invited!

"HERCULES"

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RED-STRAND WIRE ROPE

MADE ONLY BY

A. LESCHEN & SONS ROPE CO.

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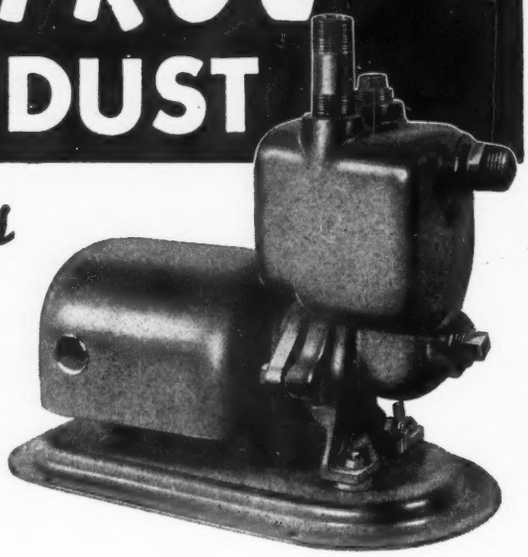
CONTROL COAL DUST

with this Tiny

MINE SPRAY PUMP



Safety in and around mines is being stressed as never before. This handy little pump has many mine applications. It is exceedingly valuable for coal dust control. Use it for spraying, mine gathering or a "thousand other uses." A husky, dependable trouble-free pump. An all-bronze self-priming centrifugal, this tiny pump is easily carried, weighing only 27 pounds complete. Fitted with pipe or common garden hose, it will lift water up to 25 feet. It delivers 8GPM at 40 lbs. pressure and more at lower pressures depending on the water lift. Equipped with Lamb Electric ½ HP universal type electric motor, 110/115 volt AC of 60 cycles or less or DC. It is also available for use on 250 volt DC lines. Immediate shipment from Mansfield stock. Ask for the little "Mine Spray Pump," the pump with many uses around a mine.

PERFORMANCE IN POUNDS PRESSURE

Pounds Pressure	20	30	40
Gallons per Minute.....	16	13	8

PERFORMANCE IN HEAD FEET

Head Feet	48	69	92
Gallons per Minute.....	16	13	8

GORMAN-RUPP MINE GATHERING PUMPS are the most dependable and trouble-free pumps made. Ask for Mine Bulletin No. 301-46.

THE GORMAN-RUPP COMPANY

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Distributed by: Guyan Machinery Co., Logan W. Va. — Weinman Pump & Supply Co., Pittsburgh, Pa. — McComb Supply Co., Harlan, Ky. — Bittenbender Co., Scranton, Pa. — Industrial Supply Co., Terre Haute, Ind. — Hoe Supply Co., Christopher, Ill. — Central Supply Co., Greenville, Ky. — Ebbert & Kirkman Co., Inc., Birmingham, Ala. — Henszey Co., Watertown, Wisc. — Union Supply Co., Denver Colo. — Mill & Mine Supply Co., Birmingham, Ala.

screen and dry-cleaning facilities; raw coal 3½x0-in. plus crushed hand-picked bony is to be fed to prescreen section where ⅜x10-mesh is removed for dry cleaning, with 10-meshx0 loaded direct to 10-meshx0 raw-coal bin; refuse from dry cleaner then to be combined with the normal 3½x⅜-in. raw coal prior to cleaning in a McNally-Norton automatic compound washer equipped to crush and rewash middle-gravity fractions at separate gravity; all washed coals to be dewatered and sized on Allis Chalmers screens, and binned in existing storage bins for loading out direct, or mixing with dry cleaned coals.

H. C. Frick Coke Co., Robena Stope mine, Greene county, Pennsylvania—Delivery by the Deister Concentrator Co. of eight SuperDuty Diagonal-Deck coal-washing tables and two Concenco revolving feed distributors for feed distribution to SuperDuty tables.

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Coal Publications

Installation of a Model Man Cage at the Avoca Shaft of the Heidelberg Coal Co., Avoca, Luzerne County, Pa., by E. H. McCleary and J. V. Mather. U. S. Bureau of Mines, I. C. 7407. 5 pp., plus 18 pp. of illustration. 8x10½-in.; paper; mimeo.; free. Modeled after the conventional office-building elevator and equipped with all modern safety devices, the new cage has the advantages of low first cost, low power costs, reduced operating personnel and added safety.

What Is Coal?, by Reinhardt Thiessen. U. S. Bureau of Mines, I. C. 7397. 53 pp., plus 11 pp. of illustrations. 8x10½-in.; paper; mimeo.; free. Formation of coal, occurrence of types, methods of type classification and physical and chemical properties. Illustrated with microphotographs.

Annual Report of Research and Technologic Work on Coal, Fiscal Year 1946, by A. C. Fieldner and P. M. Ambrose. U. S. Bureau of Mines, I. C. 7417. 142 pp., plus 31 pp. of illustrations. 8x10½-in.; paper; mimeo.; free. The Bureau's eleventh annual report on its research on coal and coal products, based on most of the published articles covering results of war investigation.

Statistical Report on the Size Grading of Coal, by R. L. Brown. British Colliery Owners Assn. and British Coal Utilization Research Assn., 13 Grosvenor Gardens, London, S. W. 1. 44 pp. 7½x9¾-in.; paper. Report of investigations that led to proposals for a system of size classification and nomenclature just prior to nationalization of the mines.

Carbonizing Properties of Hill-Bed Coal From Hickey No. 1 Mine on Lookout Mountain, Cherokee County,

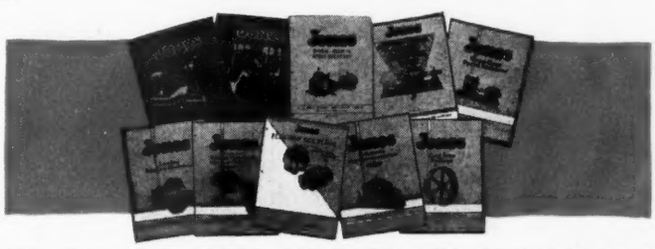
JONES DRIVES *for the coal industry*

IF you have problems involving the application of speed reducers and other transmission products to belt and scraper conveyors, bucket elevators, feeders, railroad car dumps, loading booms and similar services, we believe you will be interested in the Jones bulletins and catalogs listed below.

This technical literature plus a vast amount of data in our files cover most of the drive problems likely to be encountered in the production and preparation of coal.

The accompanying illustrations show some typical applications of Jones drives in leading mechanized mines in Southern Illinois. In the preparation plants of Bell & Zoller Coal Mining Company, Peabody Coal Company, Pyramid Coal Corporation and the United Electric Coal Company, Jones drives are extensively used. At the Ziegler preparation plant of Bell & Zoller, for example, some 25 Jones speed reducer units ranging from 5 Hp. to 100 Hp. are in service.

In every coal mining field you will find Jones drives standing up under the severest punishment of present day production schedules. We believe you will want to know more about how and why these drives can "stand up and take it." A line from you will bring any of the bulletins or detailed information on any drive problem that you may have.



ANY, OR ALL, OF THESE JONES CATALOGS WILL BE SENT ON REQUEST

No. 70—Jones Herringbone Speed Reducers
No. 71—Jones Cut and Molded Tooth Gears
No. 75—Jones Worm Helical Speed Reducers
No. 68—Jones Worm Gear Speed Reducers
No. 55—Jones Spur Gear Speed Reducer Units
No. 60—Jones Lemley Friction Clutches
No. 58B and 76—Jones V-Belt Sheaves
No. 78—Jones Flexible Couplings (4 pages)
No. 56—Jones Roller Bearing Pillow Blocks
No. 69A—Jones Cast Iron Pulleys

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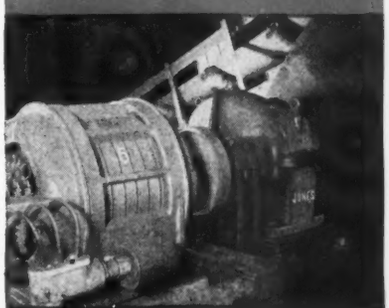
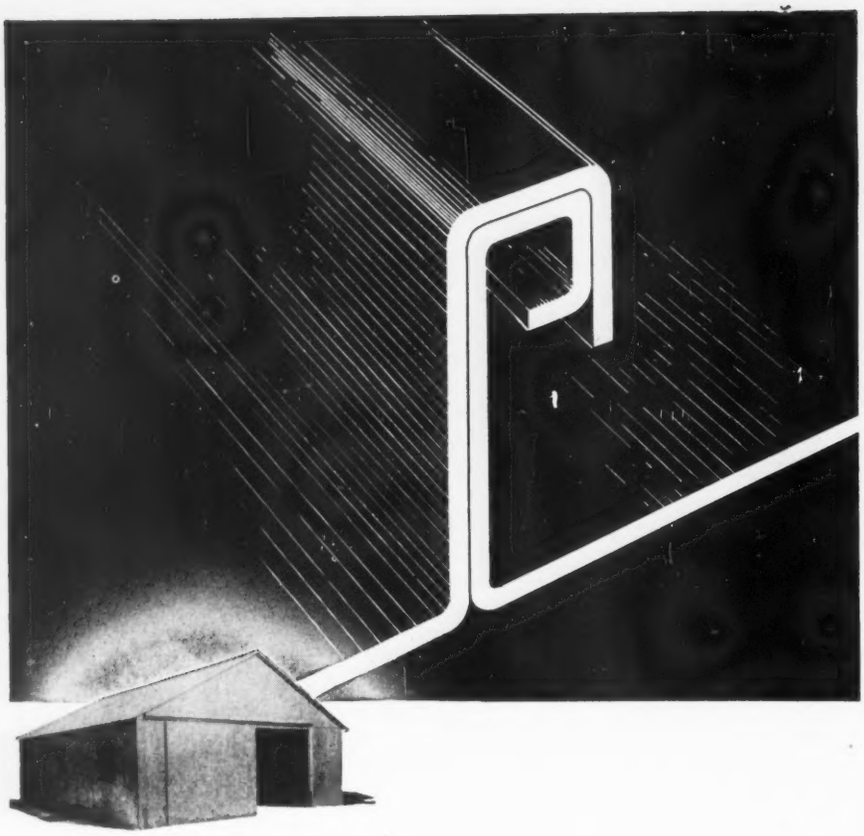
HERRINGBONE — WORM — SPUR — GEAR SPEED REDUCERS • PULLEYS • GEARS • V-BELT SHEAVES • ANTI-FRICTION PILLOW BLOCKS FRICTION CLUTCHES • FLEXIBLE COUPLINGS

● Jones speed reducer, driven by 10 Hp. V-Belt drive, on raw coal by-pass conveyor belt in Harco No. 47 preparation plant of the Peabody Coal Co.

● Jones speed reducer, ratio 33.1 to 1, at 1160 r.p.m. on a 40 Hp. motor through a V-belt drive at Harco No. 47 mine preparation plant of the Peabody Coal Co.



● 150 Hp. motor driving the main 54 in. diameter lump coal conveyor through Jones speed reducer and another spur gear drive at one of the properties of the Bell & Zoller Coal Mining Co.



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It is definitely not a sign of old age because the Armco-developed STEELOX joint keeps these standard buildings trim and youthful. You'll see where they have many advantages on your properties.

With the revolutionary STEELOX method, the jointed panels provide both structural support and finished surface. Assembly is simplified, appearance improved and weathertight construction assured. Unskilled workmen quickly join the panels into a sturdy, maintenance-free structure.

Standard STEELOX Buildings are made of ARMCO Galvanized PAINTGRIP Steel and can be painted immediately or left unpainted. No pre-treatment is necessary. These buildings offer the long life and low upkeep of a permanent structure, yet when necessary can be quickly dismantled and re-erected at another location. And all-steel construction is an excellent fire-barrier.

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- ✓ Service buildings
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- ✓ Tool houses
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- ✓ Time office
- ✓ Garages
- ✓ Lamp house
- ✓ Cap storage
- ✓ Head house
- ✓ Pump house
- ✓ Blower house
- ✓ Engine house
- ✓ Utility buildings

ARMCO

ARMCO STEELOX BUILDINGS

Ala., by J. D. Davis, D. A. Reynolds, W. H. Ode, R. E. Brewer, D. E. Wolfson and G. W. Birge. U. S. Bureau of Mines, T. P. 703. 40 pp. 5⅞x9⅛-in.; paper; 15c. Supt. of Documents, Government Printing Office, Washington 25, D. C.

Powder-Powered Tools: The Firedamp Safety of Devices for Splicing Cables and Punching Rails, by A. R. T. Denues. U. S. Bureau of Mines, R. I. 4105. 11 pp. 8x10½-in.; paper; mimeo; free. A total of 83 gallery tests of the powder-powered cable splicer and 60 gallery tests of the powder-powered rail punches were made without ignition of 8 percent mixtures of natural gas and air. Indications are that these tools can be used safely in coal mines if certain modifications are made in the rail punch.

Approval of Newly Developed Self-Contained Breathing Apparatus, Instructions in Its Care and Use, and Training Procedure, by G. W. Grove and E. E. Quenon. U. S. Bureau of Mines, I. C. 7413. 18 pp. 8x10½-in.; paper; mimeo.; free. Four new types of apparatus, suitable for oxygen-deficient or gaseous atmosphere free of skin-poisoning properties, have been approved as auxiliary mine-rescue equipment. Since effective time-range is from 30 to 45 minutes, limitations are placed on use of the new equipment, yet it is simple and easy to wear.

The Miner's Case and the Public Interest, by E. A. Wieck and Mary van Kleeck. Department of Industrial Studies, Russell Sage Foundation, 130 East 22d St., New York. 92 pp, 6x9-in.; paper; 50c. Chronology, documents, public statements and discussion of issues in the coal industry from May, 1946, to May, 1947.

Index to A. S. T. M. Standards, 1946. American Society for Testing Materials, 1916 Race St., Philadelphia 3. 234 pp. 5⅞x8⅝-in.; paper; free. A supplement to the 1946 A.S.T.M. Book of Standards, indexing some 1,400 standards and tests. The index indicates whether the Society has issued standard specifications, test methods or definitions covering specific engineering materials or subjects.

Lessons in Arc Welding, third edition. The Lincoln Electric Co., Cleveland 1, Ohio. 158 pp.; 5½x8½-in.; imitation leather; 50c. An extensive revision of earlier texts, designed for new and experienced welders. Fifty-eight lessons, with a questions-and-answers section and 228 photographs, illustrations and charts.

Coal Mine Accident Prevention Materials. Coal Mining Section, National Safety Council, 20 North Wacker Drive, Chicago 6, Ill. 6 pp. 8½x11-in.; paper; mimeo.; free. Index and survey of National Safety Council publications on coal-mine safety, with price list.

Where men and machines must work in unison for maximum output—misfits and delays are costly. Each man, each piece of machinery, each TRUCK is a vital part of any mine operation.

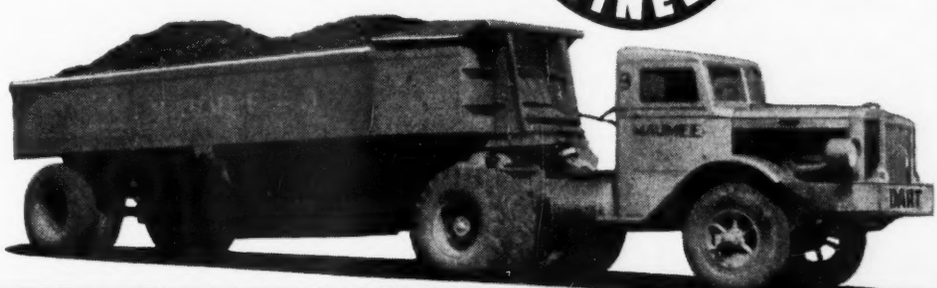
The right truck for your job, a TONNAGE ENGINEERED DART, is insurance against tie-ups at the loader, on the road, or at the hopper. The correct number of Trucks with just the right speed, power, capacity—these are the essentials of dependable, economical haulage.

THAT'S
"TONNAGE ENGINEERING BY DART"

Dart Trucks

TONNAGE ENGINEERED

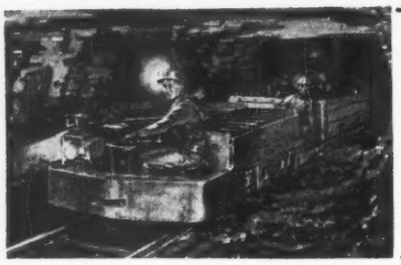
CONSULTATION WITH OUR ENGINEERS IS INVITED



DEPENDABLE PERFORMANCE SINCE 1938

Through grueling wartime demands—ON SCHEDULE—with many more economical miles ahead.

DART TRUCK COMPANY • OAK AT 27th STREET • KANSAS CITY, MISSOURI



Equipment News

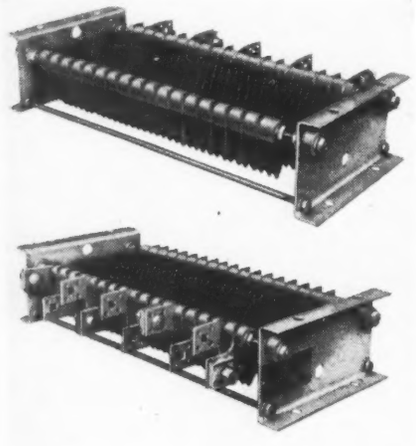
More Detailed Information and Descriptive Literature Normally Are Available on Request Directly to the Manufacturer

Resistor Sections

For use in electric-motor controllers and starters, The Electric Controller & Mfg. Co., Cleveland 4, Ohio, has announced a new line of non-breakable resistor sections in which the resistor ends are offset and spot-welded together to form a continuous path throughout the section. Terminal plates for external connections also are welded in place.

Known as "TAB-WELD" plate resistors, the individual resistors, the company states, are stamped in the form of grids from flat-rolled corrosion-resistant chromium alloy steel. After stamping, the end convolutions of each grid are offset—one end to the right and the opposite end to the left. When placed on the supporting rods, these offset resistors form a zig-zag pattern, bringing the ends of two adjacent resistors into intimate contact on one side and separating them on the opposite. Molding insulating spacers, stated not to soften below 2,000 deg. F., are used between the separated ends.

Each resistor has a tab at each end that extends below the grid eyes and supporting rods. Terminal plates on one side of the section are placed on the supporting rods and against the mated resistor ends at frequent intervals. These terminal plates also have tabs to match the resistor tabs. All



adjoining tabs are spot-welded together to form a continuous path from one section to the other. This welded construction, the company declares, prevents burning at the grid eyes or taps.

Terminal clamp blocks supplied with these resistors have grooves to accommodate several sizes of wire. They are bolted to the terminal plate and can be moved readily from plate to plate to provide the desired resistance between steps. If flat bus is preferred for the external connections, it may be bolted on by the four holes in each terminal plate. Internal nuts on the supporting rods clamp the grid stack independently of the end-frame clamping. Sections are available in several capacities and are of the same width, length and height, the company states. Standard mill sections are built with the same resistors per section.

•

Portable Floodlight

A new unit, consisting of two 1,500-watt flood lamps topping a portable light tower and generator rig, developed by the Arrow Supply Co., Pittsburgh, and mounted in a half-ton all-steel Bantam utility trailer manufactured by the American Ban-

tam Car Co., Butler, Pa., has been developed to provide lighting for night construction, mining and other work.

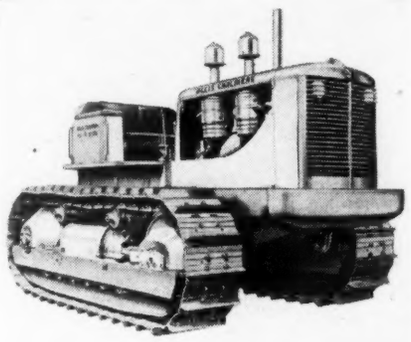
The welded steel tower is said to operate on a hinge fastened to the trailer canopy. When erected, the tower is 18 ft. high and, when folded, has approximately 9-ft. road clearance. The lights, which are clear globes in reflectors, are pivot mounted and have adjustable beam and spread. Welded to the steel bed of the Bantam trailer is a gasoline-powered generator, manufactured by D. W. Onan & Sons, Minneapolis. It has a 5-gal. fuel tank and can be started automatically, providing a.c. power for the lights almost instantaneously. A 12-volt circuit for battery charging also is included.

•

Tractor

Allis-Chalmers Mfg. Co., Milwaukee, Wis., announces that manufacture of what it declares to be the world's largest most-powerful crawler tractor—the HD-19 diesel—is now under way. Features cited by the manufacturer include the following:

Increased Capacity and Longer Life—A three-stage hydraulic torque



converter in the power train greatly increases the tractor's capacity for doing work. Application of the liquid-drive principle permits horsepower output of the engine to be held constantly near the maximum.

Longer Life and Dependability—Strength, simplicity and dependability were prime considerations in design. Operating adjustments, maintenance points and major assemblies are so located and designed that care, maintenance and repair can be accomplished with the least possible effort and loss of time. Positive-seal grease-packed truck wheels, idlers and support rollers are serviced at the factory and thereafter require greasing attention only once every 1,000 hours. Longer life is assured by the shock-eliminating feature of the hydraulic torque converter.

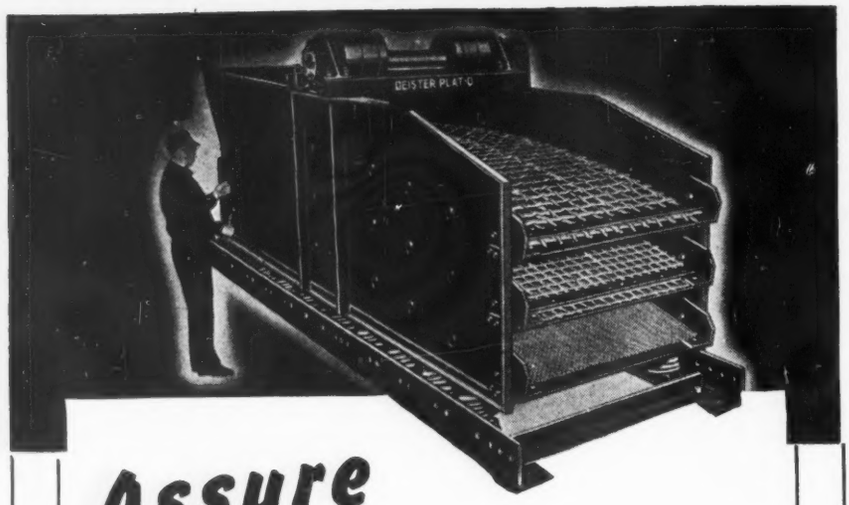
Improved Operator Comfort—A wide, comfortable, easily adjusted operator's seat affords maximum visibility both to the front and the rear. Hydraulically powered steering levers reduce driving effort. Adjust-

One-third more units per ton
with
J&L OTISCOLOY
HIGH-TENSILE STEEL

One-third more units per ton is achieved by many manufacturers who take advantage of the extra strength of J&L Otiscoloy High-Tensile Steel. They reduce the amount of steel per unit 25%, eliminate dead-weight in their finished product. Write for information on how you can increase your production per ton with J&L Otiscoloy compared to an equivalent tonnage of carbon steel.

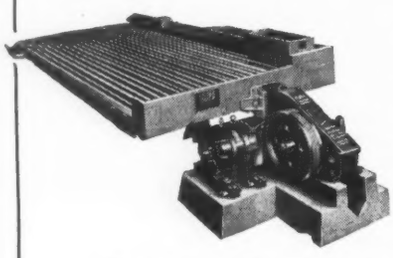
JONES & LAUGHLIN STEEL CORPORATION
PITTSBURGH 30, PENNSYLVANIA

J&L STEEL



Assure

Proper Sizing...
Thorough Recovery



Two important mechanical contributions toward profitable coal mining are the Plat-O Vibrating Screen and the Plat-O Coal Washing Table.

The powerful action and opposed elliptical throw of the Plat-O Vibrating Screen gives you *faster*, more *accurate* sizing.

The Plat-O Coal Table assures you substantially complete recovery of fines as small as 1/16" x 0" at a normal rated capacity of 15 tons per hour per table. It saves *marketable* coal that otherwise would be lost to the gob pile or sludge pond.

Write the Deister Machine Company for full information on Plat-O Vibrating Screens and Plat-O Coal Washing Tables.

DEISTER MACHINE CO.
Fort Wayne 4, Indiana

PLAT-O
by DEISTER

able brake pedals, self-energizing brakes, convenient arrangement of other controls and a large, clear operator platform are additional features eliminating fatigue and insuring top operator efficiency. Fluid power eliminates much of the gear shifting that otherwise is necessary. The HD-19 transmission has only two forward speeds (0 to 3 m.p.h. in low gear and 0 to 7 m.p.h. in high) and one reverse (0 to 5.5 m.p.h.).

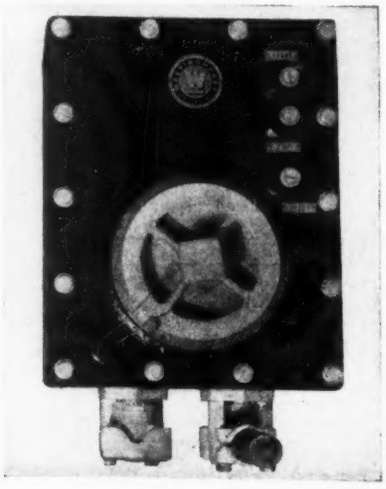
Other features cited by the company include: A-frame track-stabilizer design eliminating twisting strains and providing rigid track alignment; 84-in. track tread and 8 ft. 10⅝ in. of track on the ground. The unit is powered by a 6-cylinder 2-cycle General Motors diesel engine of the type used on other AC tractors.

•

Starter

A new explosion-tested, permissible linestarter for use with d. c. motors up to 5 hp. on circuits of 80, 115, 230 and 550 volts which may be safely started by connecting directly to the line, has been announced by the Westinghouse Electric Corp., Pittsburgh 30.

The contactor is equipped with magnetic blowouts that quickly rupture the arc and minimize burning of contact tips. A heavy spring provides quick-break action, according to the manufacturer. Overload protection is provided by an inverse-time-limit thermal-overload relay for either automatic or manual reset that permits moderate overloads but acts instantaneously if load is sufficient to damage the motor. Short-circuit protection is provided by a fuse of such rating that it will not break the circuit on ordinary overload or the starting inrush current. All operating mechanism is enclosed in a welded cabinet of heavy steel plates and a hand hole in the cover facilitates the replacement of fuses or heaters. Pushbutton and reset button are mounted in the cover, or the pushbutton may be located remotely if desired.



DETONITE Speeds the Stripping Cycle

DETONITE is the patented, surface-sensitized explosive that only King Powder can make. Its slow spreading, heaving action lifts and fully displaces overburden without killing the coal. Rock is broken into easy-to-handle sizes. You get faster, more continuous shovel operation, longer equipment life, at less cost per ton.

SEE DETONITE IN ACTION

We'll arrange a trial in your pit, under your actual operating conditions, at your request. Then you can see for yourself DETONITE'S many superiorities. No obligation, of course. All you need do is write or phone us—we'll do the rest. Investigate DETONITE, today.

KING EXPLOSIVES

DETONITE

THE PATENTED SURFACE-SENSITIZED HIGH EXPLOSIVE

THE KING POWDER CO.
INC.
CINCINNATI, OHIO
INCORPORATED 1878

NEW LIFE FOR OLD CABLES

7 Point Superiority

1 Double grip . . . both sides adhesive.

2 Great tensile strength . . . tough.

3 Won't tear, ravel or pucker.

4 Resists abrasion.

5 Acid- and alkali-proof.

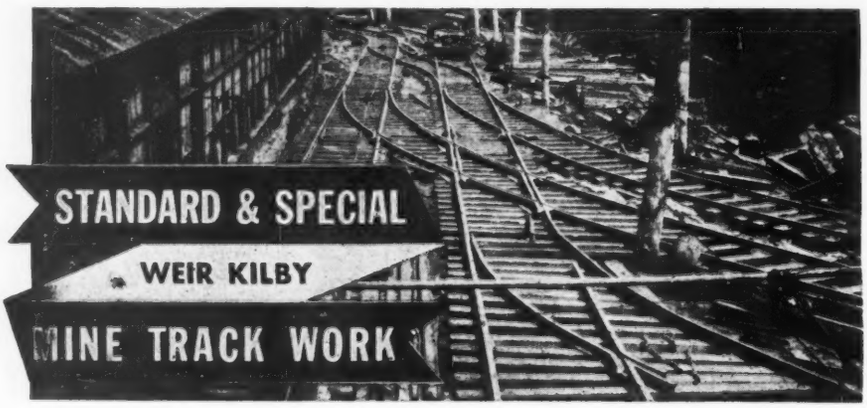
6 Extra thick . . . one layer insulates.

7 Exceeds A.S.T.M. specifications by 300% in adhesiveness, 26% in tensile strength, 290% in dielectric strength.

RUBEROID

INSULATING TAPE

The RUBEROID Co., Executive Offices, 500 Fifth Avenue, New York 18, N. Y.



One of the surest ways to speed up coal production in these days of phenomenal demand, is to plan at once for the most efficient possible trackage, inside and outside the mine. Weir Kilby has developed many light weight and medium weight elements of track work especially for the mines.

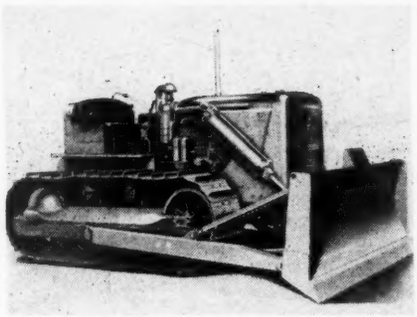
We constantly carry in stock hundreds of mine turnouts, complete with Weir Titan Frogs, switch points, and stands in the standard angles and various rail sections, so as to facilitate immediate shipments. For other needs, your orders will be made up in the shortest possible time.

CATALOG "H" comprises 154 pages of helpful data, replete with photos, drawings and specifications, covers every track work need. A request on your letterhead will bring your copy promptly.

Suppliers to Mines and Railroads Since 1882

WEIR KILBY CORPORATION

CINCINNATI 12, O. BIRMINGHAM 7, ALA.



Bulldozers

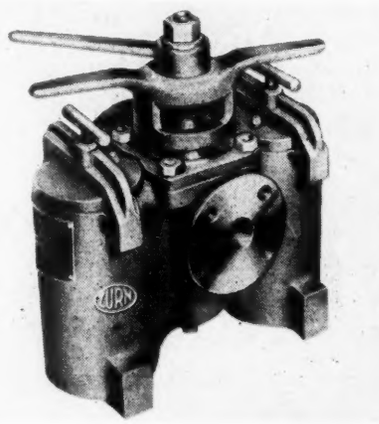
Caterpillar Tractor Co., Peoria, Ill., has announced four new sizes of hydraulic-controlled bulldozers. Designed exclusively for use with Caterpillar Diesel D8, D7, D6 and D4 track-type tractors, the new bulldozers are matched in quality and capacity to the power of the tractors for which they are designated. They are offered in addition to Caterpillar cable-controlled bulldozers for the D8, D7 and D6 models. The new machines are said to combine the built-in ruggedness and working ability of Caterpillar bulldozers and the advantages of a closed hydraulic system developed to a high state of efficiency.

The hydraulic-controlled bulldozers retain the exclusive Caterpillar qualities of balanced design, correctly curved moldboard of multiple box section design, reinforced box-section push arms or "C" frame as offered with the straight-type or angling-type bulldozers, digging characteristics, visibility, and ease and rapidity of making blade pitch and angling adjustments. Both straight- and angling-type blades are offered in bulldozers for D6, D7 and D8 models. Only the straight-type blade is now available for the D4 model.

•

Strainer

A new-type duplex or twin sediment strainer, said to be designed for economical use in continuous-flow pipelines, has been announced by the J. A. Zurn Mfg. Co., Erie, Pa. When the strainer is to be cleaned, flow can be diverted from one basket to the other without interrupting passage through the strainer. The unit



FOR BIGGER PAYLOADS — — AMSCO PLUG-WELDED DIPPERS

Amsco Plug-Welded Dipper Doing Tough Rock Digging Job at Lassiter Quarry of Bryan, Monroe Co., Raleigh, N. C.

LIGHTER WEIGHT
. . . bigger load with every bite

Plug-welding design makes possible a lighter weight dipper. Plugs in one casting fit in sockets in overlapping casting forming groove for weld deposit—gives strength with minimum use of welding material . . . permits interlocking design that reduces total weight . . . eliminates need for heavily reinforced sections.

Use all available shovel power to move a bigger load with every bite.

FASTER DIGGING
. . . greater yardage in every shift

Plug-welding eliminates jutting weld shoulders that resist penetration, loading, and dumping . . . contoured lip and easily-replaced teeth give clean bite for faster digging. Surface of manganese steel work-hardens under impact—takes on a "plowshare" polish that combats abrasion . . . offers minimum frictional resistance in loading and dumping. Flared body tapers out to door for faster unloading—material can't bridge.

GREATER STRENGTH
. . . no lost time for breakdowns

Plug-welding provides maximum strength as well as minimum weight.

Austenitic Manganese Steel is used throughout—further assurance of maximum durability and service life. Impact work-hardens the surface of "The Toughest Steel Known" to as high as 550 Brinell while body metal retains its basic toughness.

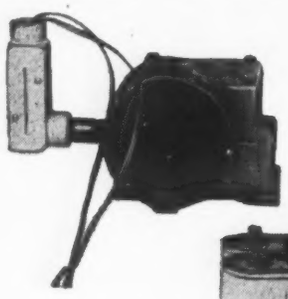
CAPACITIES ½ YARDS AND UP ——————— *SEND FOR INFORMATION*

AMERICAN Brake Shoe COMPANY

AMERICAN MANGANESE STEEL DIVISION
CHICAGO HEIGHTS, ILL.

Foundries at Chicago Heights, Ill., New Castle, Del., Denver, Colo., Oakland, Calif., Los Angeles, Calif., St. Louis, Mo.
Offices in principal cities. In Canada: Joliette Steel Limited, Joliette, Que.

Air Alarm!



Roxbury Air Alarm only, without blinking light to give you revolutions of your fan $87.50.

Roxbury Visual and Audible Mine Fan Signal with blinking light complete — $124.00.

Write for descriptive circular today.

ROXBURY

MACHINE SHOP, INC.

JOHNSTOWN PA.

Memo to
MINE OWNERS...
COAL OPERATORS CASUALTY COMPANY
THE SYMBOL OF SERVICE FOR COMMERCE AND INDUSTRY
Our effective Compensation Insurance, backed up by our Expert Technical Service, can aid you in improving production methods and safety practices, while reducing insurance rates, accidents, litigations and lost man hours.
Specialists in
WORKMEN'S COMPENSATION
and
PUBLIC LIABILITY
(Automobile Excepted)

COAL OPERATORS CASUALTY COMPANY

GREENSBURG, PENNSYLVANIA

operates by means of a single plug-type valve whose orifii direct flow from the inlet to either basket, or both simultaneously. The strainer is made in bronze, steel, semi-steel or special alloys to specifications, in sizes 1 to 6 in., and in larger sizes to order.

•

Trailing Cable

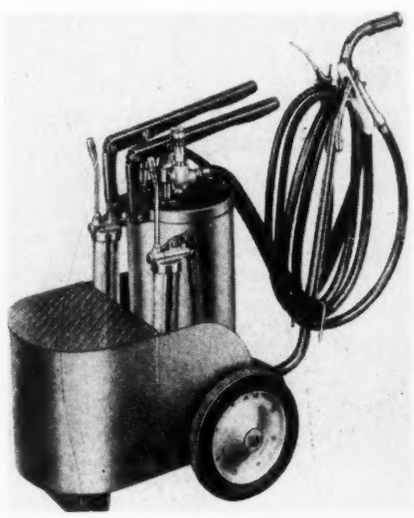
A new trailing cable said not to spark when short circuited is now available from the U. S. Rubber Co., New York. Developed jointly by engineers of U. S. Rubber Co. and Leonard Wilson, consulting engineer, Independent Coal & Coke Co., Salt Lake City, Utah, (*Coal Age*, October, 1946, p. 81), the cable features a fine strand of copper wire imbedded between the inner and outer layers of insulation. In the event of damage to the insulation the fine wire picks up incipient current leakage before an arc can occur and carries it to a sensitive circuit breaker that cuts off power.

•

Lubricant Cart

The Graco Lube Service Cart, said to be a complete lubrication department on wheels needing no air or electric connections and carrying a generous supply of three different lubricants (two greases and one oil), has been announced by the Industrial Division, Gray Co., Inc., Minneapolis 13, Minn.

This specially designed, one-man operated, portable unit makes systematic, multi-bearing lubrication practical and profitable, according to the manufacturer. The lightweight, sturdy, compact cart is mounted on two semi-pneumatic tires. The 1-lb. lever guns and ½-pt. pistol oiler are included. Pressure lube pump has a built-in gun loader for hand guns. Lube and oil compartments are easily filled without removing pumps. The front section of the red-enameled cart incorporates a large tool box with hinged lid, which also serves as a platform step for the operator to reach high bearings.



Don't Fatten The Slurry Pile...

USE B-Z ROUND BAR SCREENS

Heavy cross rods give extra strength.
Nickel steel bars form long lasting, non-blinding screen surface.
Welded Construction
Constant screen opening, even when top area of screen is worn.

A fat slurry pile means good saleable coal is being wasted at the washery — and it's time to investigate the money saving features of B-Z Round Bar coal preparation screens. With B-Z Round Bar screens you get:

LONGER LIFE FROM WEAR-RESISTING BARS — B-Z Round Bar screens are made of stainless steel — all-welded construction. They're harder and last longer.

CONSTANT OPENING — NO BLINDING — Round Bar construction provides a long narrow slot-type opening which minimizes blinding. Wear on top of round bars does not change screening efficiency.

CHOICE OF OPENING AND DESIGNS — B-Z screens are available in a variety of screen openings and bar sizes from 1/16" to 1/4" — for shakers, vibrators, or centrifugal dryers. B-Z screens can be designed to fit your specific needs.

Don't lose money in the slurry pile. Investigate the proven savings of Bixby-Zimmer Round Bar coal preparation screens today.

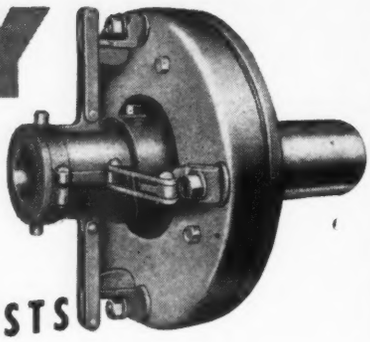
BEE ZEE

BIXBY-ZIMMER

ENGINEERING COMPANY

961 ABINGDON ST. GALESBURG, ILLINOIS

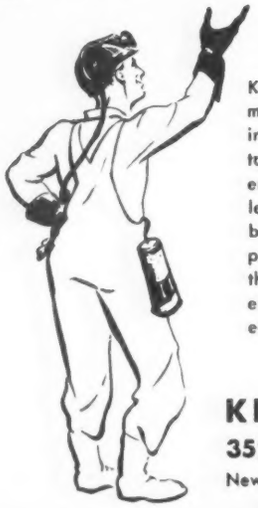
KINNEY



INTERCHANGE CLUTCHES

REDUCE OPERATING COSTS

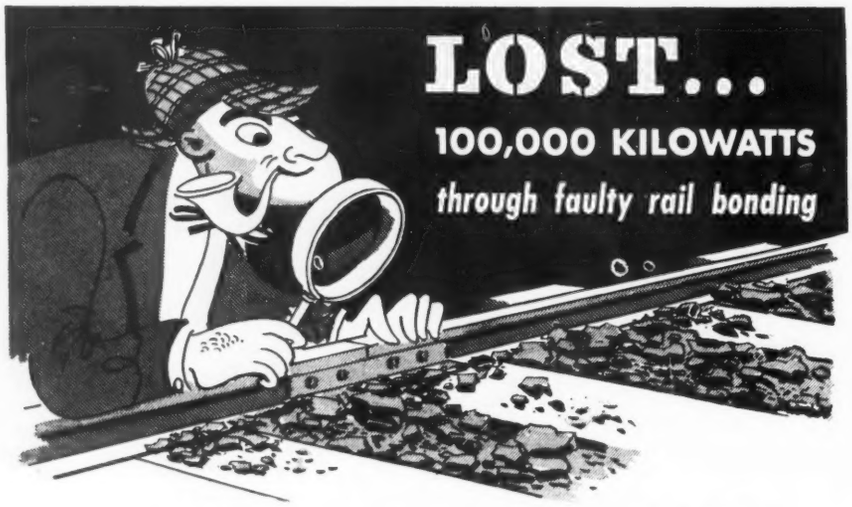
PROMOTE SAFETY



Kinney Interchange Clutches on individual motor drives allow the motor to come up to speed without load, permitting use of small, inexpensive motors to run the equipment. Built to slip just enough to pick up the load, without lowering the capacity when fully engaged, these clutches require but light pressure on the shift lever to effect smooth, positive engagement. Since the load can be instantly released and the machinery stopped, Kinney Clutches provide maximum operating safety. Power is transmitted directly through metal or asbestos flat discs and not through bolts or engaging mechanism. Furnished solid, or in split construction for easy installation in capacities 2 to 40 H.P. per 100 r.p.m.

Bulletin K-8 lists the complete line of Kinney Clutches.

KINNEY MANUFACTURING CO.
3525 WASHINGTON ST., BOSTON 30, MASS.
New York • Chicago • Philadelphia • Los Angeles • San Francisco
We also manufacture vacuum pumps, liquid pumps, and bituminous distributors



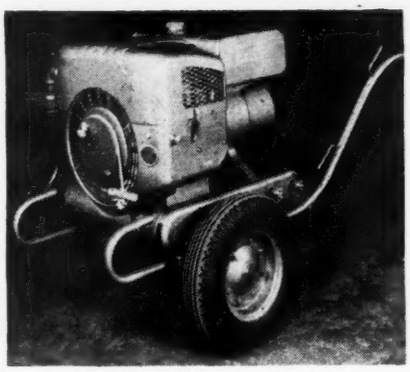
Don't let this happen in your mine. Get *Mescoweld* Rail Bonds and insure maximum power at all times.

Mescoweld Rail Bonds are flashwelded by a patented process to eliminate dead ends and assure perfect conductivity. Electrical resistance is further decreased by oversize terminal.

There are eighteen types of Mescoweld Rail Bonds to meet every bonding requirement. Each is soundly engineered from start to finish to do a perfect bonding job . . . all types are available for immediate delivery. Write for complete information.

Mosebach Electric & Supply Co.
1115 Arlington Avenue Pittsburgh 3, Pa.
HEmlock 8332

Type M8-F



Portable Welder

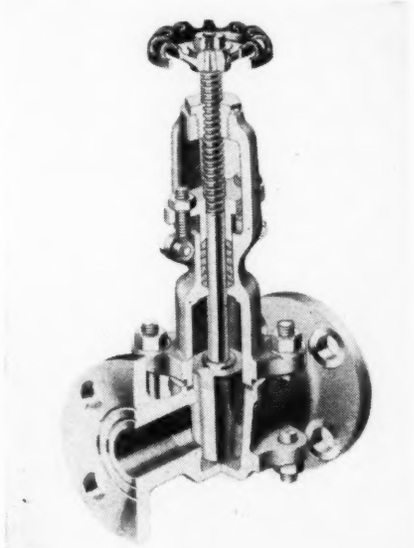
A new portable gas-driven d.c. arc welder, said to weigh a fraction as much as conventional models, is now being produced by the Hollup Corp., a division of National Cylinder Gas Co., Chicago. The "Sureweld" is 32 in. long, 26 in. wide, stands 28 in. high (without wheels) and weighs 315 lb. Light weight is achieved through use of an aluminum housing and aluminum alloys in engine parts wherever practical, it is said. The generator and engine are directly and solidly connected, forming a single compact unit.

The generator is of the four-pole, self-excited type with interpoles. The welder is rated at 150 amp. at 30 volts on 50-percent duty cycle. Electrodes up to and including 5/32-in., and certain types of 3/16-in., may be used with the welder. The manufacturer claims exceptional arc stability and economical operation. Two models are available, one mounted on a two-wheel dolly with pneumatic tires; the other, a stationary type with a guard frame.

•

Valves

Crane Co., Chicago, has announced a new line of corrosion-resistant plug gate valves that are said to provide straight-through flow in the wide-



track transportation is cheap transportation

everything in trackwork

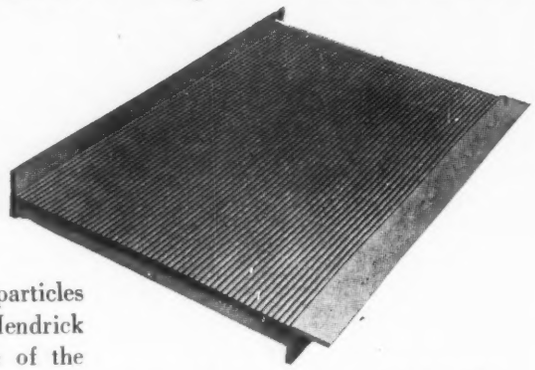
PREFABRICATED TRACK
RAILS & ACCESSORIES
FROGS & SWITCHES
COMPOSITE TIES
SWITCH STANDS
SWITCH TIES
STEEL TIES
CROSSINGS

WEST VIRGINIA STEEL & MFG. CO.
Formerly The West Virginia Rail Co.
HUNTINGTON, W. VA.

Without obligation—Let our Engineers show you what savings modern track can make for you...

Dewatering and Dryer Screens

with improved types of Wedge-Slot Profile Bars



Moisture and under-sized particles clear rapidly through the Hendrick Wedge-Slot Screen because of the uniquely designed profile bars, with openings enlarging downward. The accurately spaced slots extend uninterruptedly the entire length of the screen.

To adapt them most effectively to the particular material to be screened, Hendrick Wedge-Slot Screens are constructed with varied types of profile bars, in standard steel alloys, plain and abrasion-resisting steels, bronze, brass and duralumin. Write for full information.

SEE OUR CATALOG IN SWEET'S

HENDRICK

Manufacturing Company

41 DUNDAFF STREET, CARBONDALE, PENNA.

Sales Offices In Principal Cities

Perforated Metals
Perforated Metal Screens
Architectural Grilles
Mitco Open Steel Flooring,
"Shur-Site" Treads and
Armorgrids

FLEXIPIPE

The improved flexible tubing for mine and tunnel ventilation

This flexible air tubing is ready for immediate, easy installation. On account of its flexibility, it can be put up or taken down in a fractional part of the time required by more rigid means of face ventilation.

Write for free sample and full information.

BEMIS BRO. BAG CO.

412 Poplar Street, St. Louis 2, Mo.

MORE HAULAGE FOR 20% LESS BATTERY CAPACITY

Oil-tight, non-leak transmission. Use regular auto oil; change every 6 months.

Extra-long journal springs assure better trackability.

Large motor, to assure more horsepower per ton weight of locomotive.

Can be equipped with hydraulic brake.

GREENSBURG "RANGER"

This locomotive being used for main line haulage at the Blacksmith Coal Company, Novinger, Missouri. This is a 4½ ton locomotive, operating on 30" gauge track. This locomotive built from 3½ to 10 tons – either single or double motor-drive – 16" to 56½" track gauge.

All Greensburg Locomotives are **CUSTOM-BUILT** *to your requirements*

THE GREENSBURG MACHINE CO. 101 STANTON ST. GREENSBURG, PA.

open position secured with conventional gate valves, while being suitable for throttling service as are conventional globe valves.

Of outside-screw-and-yoke design, the new Crane plug gate valves have bolted bonnet joints and are available with either screwed or flanged ends in sizes from ½ to 2 in. They are regularly furnished in either 18-8 Mo or Monel metal. For particular corrosive conditions, they can also be made in various other alloys.

•

Roller Chain

Production of a new roller chain meeting all American standard chain specifications has been announced by the Atlas Chain & Mfg. Co., Philadelphia, formerly the Atlas Tool & Designing Co. The roller chain, which is a completely new line for the company, was developed after research into chain-drive requirements and, according to the manufacturer, offers long, rugged wear, high flexibility and an accurate fit for replacement.

•

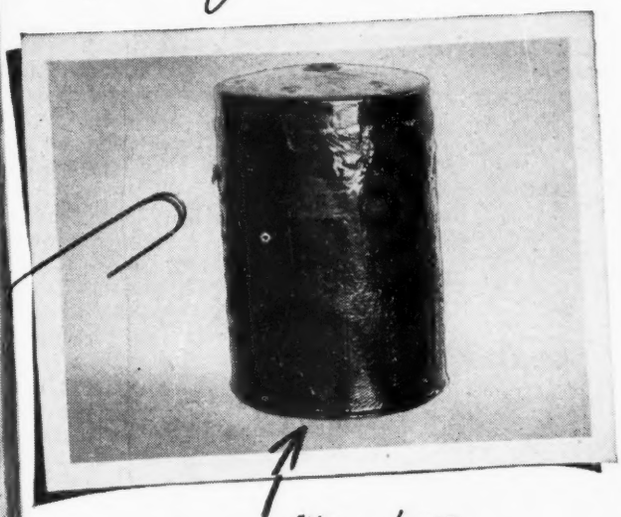
Brake Drum

An entirely new type of brake drum, designed to contribute greater safety and economy to the operation of buses, trucks and trailers, has been announced by Copperweld Steel Co., Glassport, Pa.

New principles of drum design and new methods of manufacture are employed in the making of this new brake drum, which has a friction surface of special wear-resisting alloy steel and an outside layer of copper with specially designed copper fins. Because of the high thermal conductivity of the copper, the company states, the drum dissipates friction-generated heat to the atmosphere at a rapid rate—at the same time helping to maintain a more uniform temperature level over the entire brake-drum surface. The result is virtually no "heat checking," no cracking,

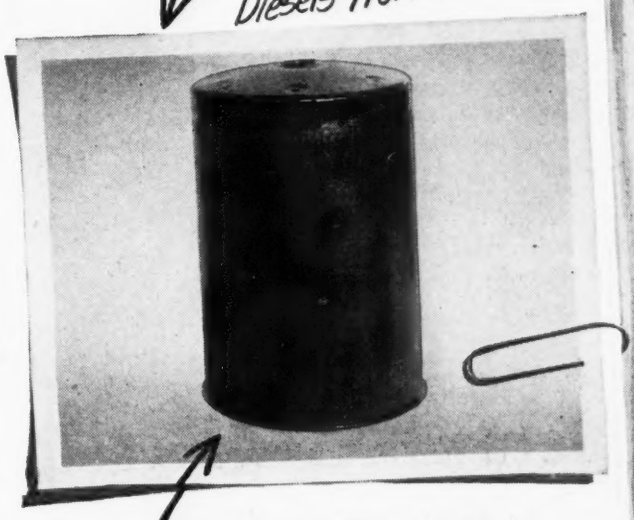
LUBE MEMO

How Joe stopped Filter Clogging



Joe says filters have gummed up like this after about 600 hours on oil he's been using

Joe says nothing but RPM Delo Oil in his Diesels from now on



Here's how the filter looked after 600 hours on RPM Delo Diesel Engine Lubricating Oil. Joe finds RPM Delo Oil keeps filters clean because:

1. It's compounded to resist oxidation and minimize sludge.
2. Its "detergent" cuts down sludge.
3. It remains stable in the presence of moisture.

DIESEL ENGINE RPM DELO LUBRICATING OIL

Set up trial Today!

DISTRIBUTED BY
Gordon Lubricating Company
In Pennsylvania, Ohio, West Virginia, Kentucky
1023 Oliver Bldg., Pittsburgh, Pa. At. 5172
Andover Road, Columbus, Ohio
Kingswood 1495

DISTRIBUTED BY
Transcentral Oil Corporation
In Indiana, Illinois, Missouri, Michigan
600 S. Michigan Ave., Chicago, Ill.
HAR. 2677
Indianapolis, Ind. Market 1401

measurably less wear on blocks and drums, freedom from distortion and greater safety, together with reduced temperatures of brake parts, tire beads, lubricants and running gear, according to the manufacturer.

•

Hose Clamp

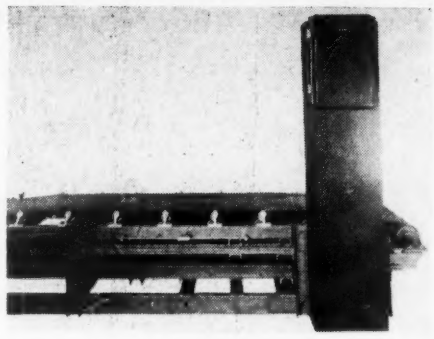
The new "Aero-Seal" hose clamp, according to the manufacturer, Aircraft Standard Parts Co., Rockford, Ill., employs a worm-drive principle of operation that affords greater clamp strength and uniform clamping pressure all around the hose. Aero-Seal, it is said, is easily and quickly applied without removal of hose, is leakproof, has no loose parts, is vibration proof and reusable.

The clamp is available in sizes from ¼ in. to 3¼ in. I.D. hose, and in larger sizes to order. It is made in both rust-resistant carbon and stainless steel. It can be used on all kinds of air, oil and coolant lines.

•

Conveyor Weigher

A new development in the continuous weighing of dry materials on conveyor belts is offered by Builders-Providence, Inc., Providence, R. I., in the Conveyoflo meter. This meter,



according to the company, utilizes diaphragms instead of the usual knife-edge-beam principle for metering flow of dry materials by weight. Bulky overhead framework, scale beams, knife edges, tie rods, etc., are eliminated, it is stated.

The weighing section of the Conveyoflo Meter is supported at one end by self-aligning ball-bearing pillow blocks and at the other end "floats" on a diaphragm that transmits load changes hydraulically to the weighing mechanism. The cyclometer-type totalizer reads directly in any unit desired. It is non-cyclical in operation, employing the time-proved disk-and-wheel integrating principle, and is automatically corrected for any belt-speed variations. Integration is automatically compensated for variations in belt weight and for adherence of material to the belt, it is said, through a system of return-belt weighing.

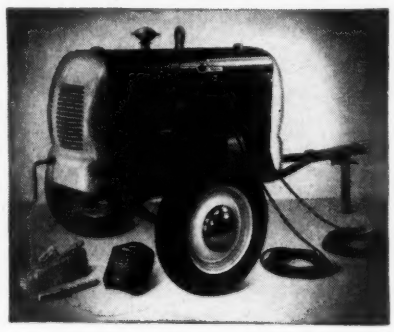
•

Welder

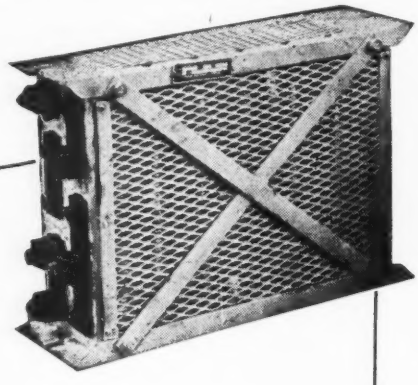
A new Flexarc lightweight engine-driven d. c. welder, designed for 200 amp. at 30 volts on the basis of a 50-percent duty cycle, is now available from the Westinghouse Electric Corp., Pittsburgh 30. Each welder comes with complete accessories, ready to weld, including work and electrode leads, helmet, electrode holder, a liberal supply of electrodes and a wire scratch brush.

Dubbed "The Ranger," this welder can be towed anywhere a jeep can take it, according to the manufacturer. The design characteristics of the generator provide easy striking and maintenance of the arc for shop quality welding on steel, cast iron, alloy, hard surfacing aluminum and brass.

The generator is direct-connected to a Hercules IXB engine. The welding current is adjusted over a wide



An external frame, supporting the helical coils in G. M. C. Resistances prevents damage due to jolts and vibration . . . thus insuring longer useful life. Added protection includes a shield to protect coils from ouside injury. The coils are highly resistant to damage from mine water and mill fumes. Insulators are of a type not affected by sudden changes in temperature. For a really sturdy resistance unit, choose G. M. C.!



Protected Construction lets G. M. C. Resistances do a better job, longer!

Guyan Machinery Company
Logan, West Virginia

Comply
WITH THE FEDERAL SAFETY CODE

Tamping Poles made of round sandpapered hardwood up to 10-ft. length.
1" Diam., 5¢ ft. 1¼" Diam., 9¢ ft. 1½" Diam., 12¢ ft.

ROXBURY MACHINE SHOP, Inc. Johnstown, Pa.

KREMSER CONVEYOR EQUIPMENT

Simplicity IN DESIGN

STRENGTH in Construction

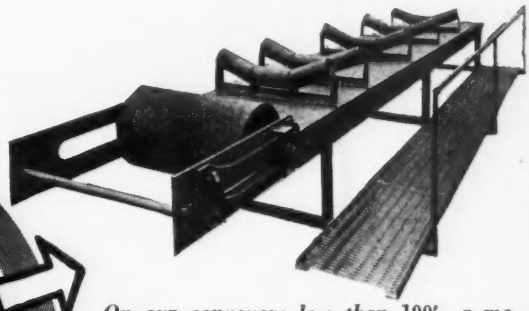
IF YOU NEED A BELT CONVEYOR, specify KREMSER and then you will *be sure* of installing a unit that will fill your job specifications in every detail.

Simply designed, and constructed throughout of materials specially adapted for heavy-duty service, KREMSER Machines provide trouble-free operation and maximum customer satisfaction, under the most exacting working conditions.

AND REMEMBER—you can't beat a KREMSER conveyor for insuring record low operating and upkeep costs.

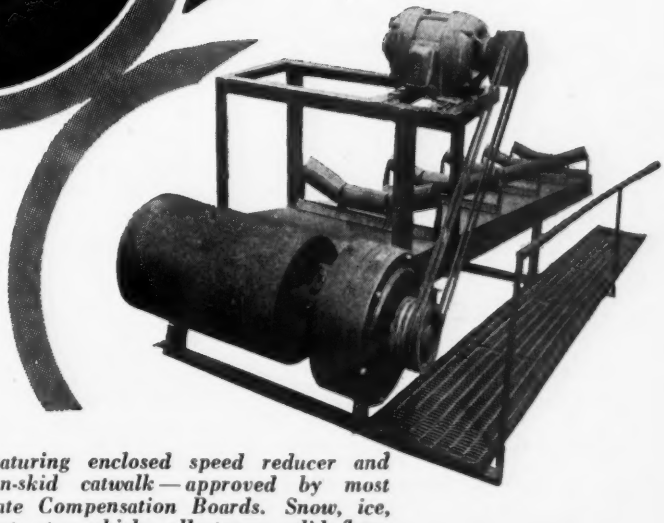
Kremser Conveyors of 100′ or longer have our standard automatic take-up, which is as simple and strong as possible, and is practically infallible.

ECONOMY POINTERS FOR MATERIAL HANDLERS



On our conveyors less than 100′, a mechanical take-up is used, which is very strong, simple and easy to repair. All parts easily replaced.

New, improved all steel welded, neoprene sealed, pre-greased ball bearing conveyor Idler. Never requires greasing. No maintenance—saves idler price within three years. Elimination of over-greasing reduces belt cost.



Featuring enclosed speed reducer and non-skid catwalk—approved by most State Compensation Boards. Snow, ice, dust, etc., which collects on solid floor, cannot cause slippage on this catwalk.

Write for DETAILS and PRICES

FRANK A. KREMSER & SONS, Inc.

3435 North Fifth Street, Philadelphia 40, Pa.

Regent 9-7272 • Regent 9-7524

range from 30 amp. at 20 volts to 250 amp. at 30 volts in four major steps by plugging screw locking plugs on work and electrode leads, it is said, and intermediate values of current are obtained by rheostat control. Polarity is positively controlled by interchanging work or electrode lead connections. The machine is available either as a portable or stationary model.

•

Dust Projector

The M.S.A. Dust-Vue Microprojector, designed to simplify the determination of numerical concentrations of impinger and precipitator dust samples, has been announced by Mine Safety Appliance Co., Pittsburgh 8. The new Microprojector is said to eliminate time-consuming direct-microscope counting of dust particles and the severe eyestrain resulting.

The unit projects the microscopic field image on a ruled, translucent screen, 250x200mm., with a magnification of 1,000 diameters. This greatly enlarged image makes dust-counting faster, easier, and more accurate—enables dust particles to be distinguished from pits and bubbles in the glass of the cell—and permits more concentrated samples to be counted without secondary dilution. Readily portable and sturdily built, the M.S.A. Microprojector can be conveniently used for field as well as laboratory work. Light is provided by a dependable tungsten-mercury arc lamp. Any standard fork-stand-type microscope can be used, according to the manufacturer.

•

Anti-Rust Paint

Speco, Inc., Cleveland, has announced that Rustrem anti-rust paint is now available in aluminum as well as in black. This new paint, according to the manufacturer, can be applied right over rust without brushing or scraping. It is said to immediately penetrate the rust layer, render it inactive and seal the surface against further rusting.

•

Test Clamp

The new Trico U-66 all-purpose Kliplok test clamp, said to be a sturdy, heavy-duty, shock-proof clamp to be attached to ends of cords on portable equipment and supplying a vise-like grip on flat or round objects up to 1 in. diameter or width, has been announced by Trico Fuse Mfg. Co., Milwaukee 12, Wis.

A slight twist of the large finger-tip knob exerts tremendous pressure, the company states. The clamp will carry up to 150 amp. continuously and 200 amp. intermittently. The solderless lug accommodates No. 2

PROMET
THE Engineered BRONZE

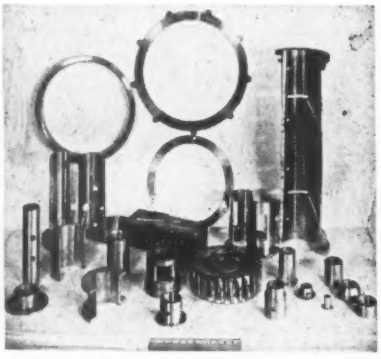
REDUCES YOUR BEARING COSTS

A SPECIFIC FORMULA FOR EACH APPLICATION MAKES FOR LONGER LIFE

AXLE BEARINGS
JOURNAL LINERS
BUSHINGS and
WEARING PARTS

For

GENERAL ELECTRIC
GOODMAN • WESTINGHOUSE
SULLIVAN • OLDROYD
JOY • JEFFREY
EQUIPMENT



PROMET BAR STOCK

Round, hexagon, square. Rough cast, semi-finished. Cored stock all sizes (by 1/8" steps) from 1/2" minimum core to 12" O.D. and 12" lengths. 6 grades of hardness.

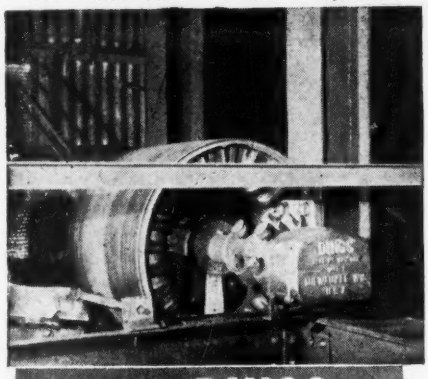
PROMET BABBITTS

Lead or tin base. 3 grades

Write for free folders.

THE AMERICAN CRUCIBLE PRODUCTS CO.
1307 Oberlin Ave., Lorain, Ohio, U. S. A.
Prompt deliveries can usually be made from stocks maintained at
BECKLEY, W. VA., The Universal Supply Co., 1207 S. Kanawha St. . Phone 7307
LORAIN, OHIO, The American Crucible Products Co. . . . . Phone 6983
Other Representatives
ALTOON, PA., Frank E. Mason, 623 Blair Ave. . . . . Phone 3-6624
BIG STONE GAP, VIRGINIA, C. P. Cornwell . . . . . Box 290
BIRMINGHAM 1, ALA., U. B. Lindstrom Equipment Co. . . . Phone 2-2176
DENVER, COLO., Wrought Service, 14th St. at Blake . . . Phone Main 0331
MT. LEBANON, PA., I. E. Nieser, 726 Rosalawn Ave. . . . Phone LE-9876
WHEELING, W. VA., Pollish & Company, 110-111 Fidelity Building . Phone 1795
WILLIAMSON, W. VA., Williamson Supply Co. . . . . Phone 1200

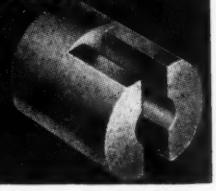
Protection Against TRAMP IRON for YOU and YOUR CUSTOMERS



with DINGS Magnetic Pulleys

Protect both your own coal handling equipment and your customer's stokers by installing a powerful Dings Magnetic Pulley to eliminate tramp iron before it can cause expensive damage. Separation is automatic and positive . . . Operating and maintenance cost about a penny a day, depending on pulley size . . . Some operators report "no cost" tramp iron protection because the sale of scrap removed more than pays for depreciation charges and operating expense! Size for size there are no more powerful magnetic pulleys built than Dings. Get full details from Dings today.

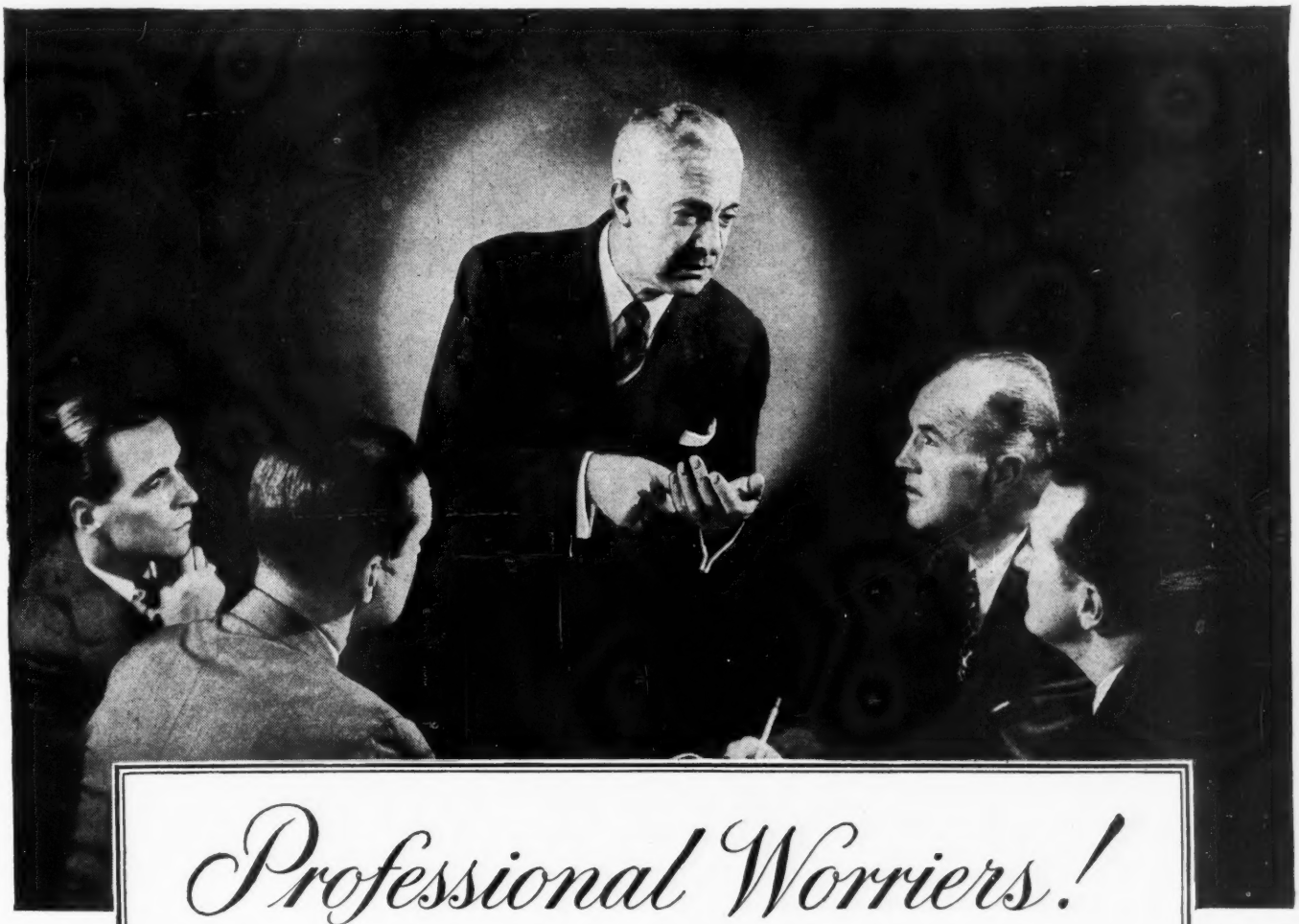
NEW! DINGS Magnetic Drill Extractor



A powerful Alnico Magnetic Drill Extractor to save redrilling blast holes when drill rod or bits break off in the hole. Dings Extractors lift up to 25 times their own weight ... Easy to use ... Can be carried in a pocket ... Write for data sheet containing complete information.

DINGS MAGNETIC SEPARATOR CO.
506 E. Smith Street, Milwaukee 7, Wisc.

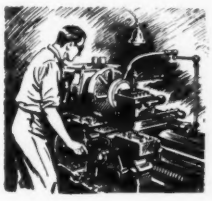
Dings
"HIGH INTENSITY"



Professional Worriers!

Every business, time and again, runs into production snags. When the problem is *lubrication*, we're often called in to do the worrying. And eight times out of ten we come up with the right answer—*fast*. Because that's our job day in, day out, year after year—putting petroleum to work *efficiently*. This backlog of experience, coupled with the world's finest lubricants and fuels, is your best reason for calling Cities Service next time trouble calls on you.

CITIES SERVICE STOPPED TROUBLE HERE!



A screw products company in Cuyahoga Falls, Ohio, called on Cities Service for advice on machining a part of an intricate mechanism made of aluminum that required extreme accuracy and finish. Chillo Oil No. 22 was recommended. Thereafter, the manufacturer reported the machined work was not only well within the required tolerances, but the work had a mirror-like finish. Tool life was also phenomenally good.

A brick and tile company in Iowa suffered numerous failures of the main drive-shaft bearings in their Hammer Mill Crushers. Cities Service engineers recommended Pacemaker Oil No. 2. The last report from the company said that since they standardized on this lubricant, no bearing failures have occurred.

"We use Solvent No. 26 for cleaning surplus oil and grease out of electric clock movements and we find it unexcelled for this purpose" ... so writes the president of an Illinois watch repairing and rebuilding concern after continued use of this remarkable new Cities Service metal cleaning fluid.

A bus company executive in Cleveland, Ohio, recently said, "During the past four years, we used Cities Service Heavy Duty type oil with outstanding results—minimum wear, freedom from sludge and no engine failures—which has enabled us to give uninterrupted service to our customers."

CITIES SERVICE OIL CO.
New York—Chicago

CITIES SERVICE

ARKANSAS FUEL OIL CO.
Shreveport, La.

Cities Service Oil Company
Room 245, Sixty Wall Tower
New York 5, N. Y.

Gentlemen: I have a production problem that involves lubrication. I would like to discuss it with one of your lubrication engineers, without obligation, of course.

NAME_____

COMPANY_____

ADDRESS_____

CITY_____ STATE_____

don't let

OLD KING COAL

freeze this winter

USE WYANDOTTE

CALCIUM CHLORIDE

• Coal freezeproofed with Wyandotte Calcium Chloride is free-flowing and easily unloaded — even in the coldest weather. It never comes out of the car battered, smashed or cracked—you can count on it being the same grade as when it went in.

• Naturally this will please your dealers. They will lose no delivery time — have to hire no extra labor. They'll remember you when they're ready to order again. And you can win their good-will at such small expense!

• We'd like to tell you more about Wyandotte Calcium Chloride—the sure, safe and economical agent for freezeproofing coal. Mail the coupon today!

WYANDOTTE CHEMICALS CORPORATION
Michigan Alkali Division, Dept. 1777
Wyandotte, Michigan

Send me literature and further information about the uses and advantages of Wyandotte Calcium Chloride.

Name_____

Address_____

Title_____

Wyandotte
REG. U. S. PAT. OFF.
CALCIUM CHLORIDE
WYANDOTTE CHEMICALS CORPORATION
Michigan Alkali Division, Wyandotte, Michigan

wire, minimum; No. 0 wire, maximum; and swivels around the clamp, permitting wire or cable to hang in a natural position.

•

Cable Holder

A new combination cable end and cable center holder that can be used to hold cables either at the ends or at any point on the length of the cable, has been developed by the Mosebach Electric Supply Co., Pittsburgh.

Cables are clasped in a few minutes simply by tightening the U-bolts, each U-bolt providing an individual grip on the cable, making it practically impossible for the cable to slip, it is said. When the holder is no longer required, it can be quickly disconnected and used elsewhere. The holders are furnished in three sizes to handle 211,600 to 500,000-cir. mil, 500,000 to 1,000,000-cir. mil, and 1,000,000 to 1,500,000-cir. mil cables.

•

Inner Tube

The U. S. Rubber Co., New York, has announced the return to production of its puncture-sealing inner tube, which contains plastic rubber inside the crown to surround puncturing objects.

By sealing the aperture caused by the puncture, it is said, the plastic rubber prevents loss of air both before and after the object is removed. Repairs are usually unnecessary because the plastic material flows back into place as soon as the object is taken out. The sealing material is held in place by a honeycomb construction to insure against "bunching up" and shifting. Developed before the war, the tube is designed for use where the danger and possibility of punctures are great and where elimination of roadside delays is essential.

•

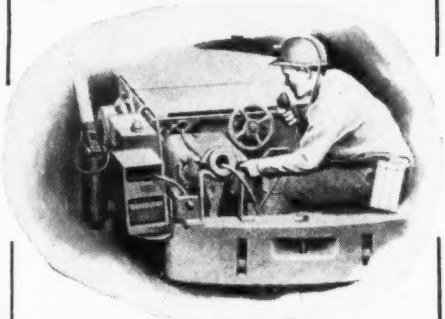
Trade Literature
Available Without Charge on Request to the Manufacturer

Variable-Speed A.C. Drive—The Louis Allis Co., Milwaukee 7, Wis. Bulletin No. 611-C describes the Allis "Adjusto-Spede" drive—an a.c. motor with infinitely adjustable speed, the company states. Operating directly off a two- or three-phase a.c. line, the unit is said to provide a variable-speed output with constant-torque characteristics through a new eddy-current principle without the usual m.g. set or exciter.

Herringbone Reducers—Link-Belt Co., Philadelphia 40, Pa. Book No. 1819 describes Link-Belt herringbone-gear units for speed-reducing and speed-increasing service, including many new sizes and types. The units

TROLLEY PHONE

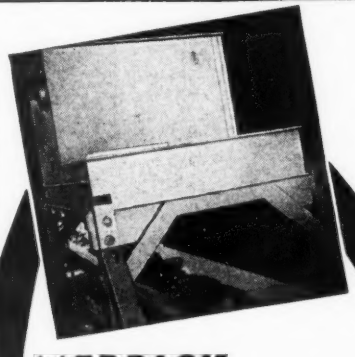
...talk between dispatcher and as many moving or stationary points as needed



The FEMCO Trolley Phone saves time, saves money, promotes safety. Small compact design of equipment permits installation anywhere. Designed and engineered for heavy duty. All plug-in units for ease of service.

Phone, write or wire for further details.

FARMERS ENGINEERING AND MFG. CO.
549 Brushton Ave. Pittsburgh 21, Pa.



MERRICK WEIGHTOMETER

While material is smoothly moving along a conveyor, the MERRICK WEIGHTOMETER keeps a continuous and accurate record of weights. Total weight is available at a glance.

Applied to any size belt conveyor, either horizontal or inclined. The weightometer gives a simplified and dependable record of your production, without interrupting the flow of coal.

Write for Bulletin 375

MERRICK SCALE MFG. CO.
PASSAIC, N. J.

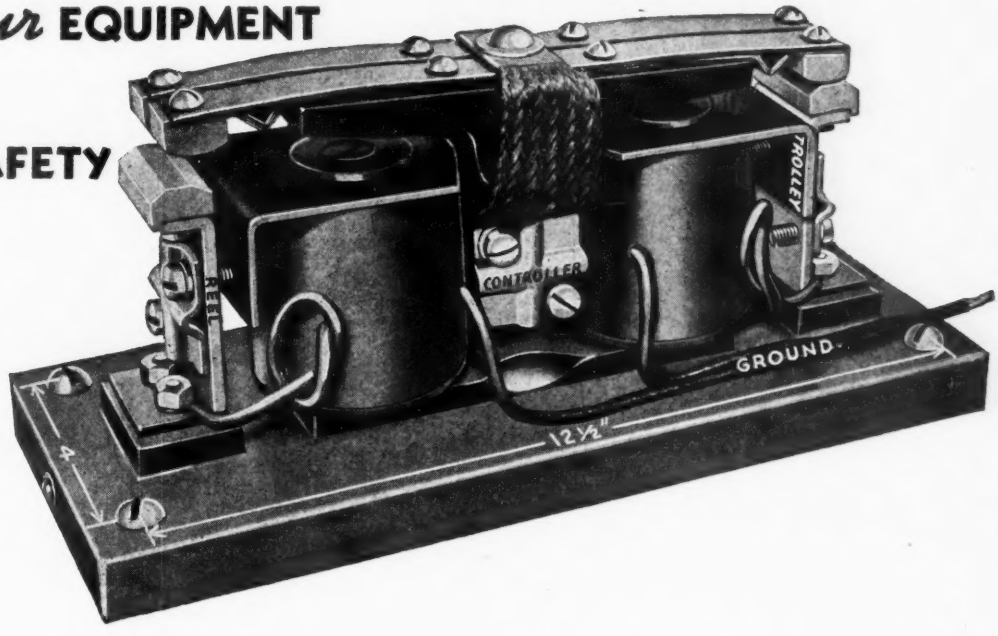
P-G *Automatic* TRANSFER SWITCH

SINGLE OR DOUBLE TROLLEY AND REEL...

ELIMINATES SHOCKS *and* BURNS

PROTECTS *your* EQUIPMENT

PROMOTES SAFETY



ENTIRELY *Automatic* . . . P-G Automatic Transfer Switches are designed for use on all types and makes of gathering locomotives.

Automatically transfers the current from trolley to reel, or vice-versa. Hand operated switches are eliminated.

Promotes safety—avoid shocks or burns to operator while changing from trolley to reel.

Simple in design, easy to install, requires very little space, and can be mounted anywhere. Furnished complete with cover.

Heavy duty coils provide for positive contact through double contact assembly. Contacts are easily renewable.

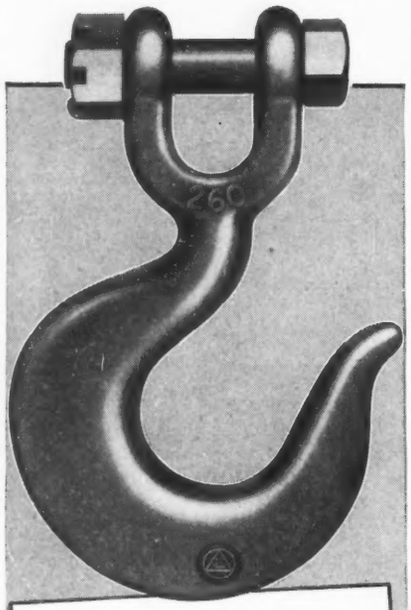
P-G

THE POST-GLOVER ELECTRIC COMPANY

• ESTABLISHED 1892 •

221 WEST THIRD STREET, CINCINNATI 2, OHIO

FITTING NEWS!



NEW CLEVIS HOOK BY LAUGHLIN OFFERS UNIQUE ADVANTAGES

- **QUICK** and easy to attach with bolt, slotted nut and cotter. No welding . . . no special fittings needed.
- **SAFE** . . . meets highest safety requirements . . . hook and bolt made of drop-forged, heat-treated steel.
- **EASY** to change . . easy to switch from job to job as needed.
- **FITS** wire rope . . . chain . . . many block straps.
- **SUPPLIED** with Safety Latch or with reversed jaw on special order.

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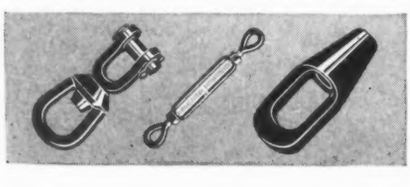
THOMAS LAUGHLIN CO.
DEPARTMENT 6, PORTLAND 6, MAINE

LAUGHLIN
THE MOST COMPLETE LINE OF DROP-FORGED WIRE ROPE AND CHAIN FITTINGS



Car Shakeout—Robins Conveyors Div., Hewitt-Robins, Inc., Passaic, N. J., Bulletin No. 128-A completely describes and illustrates the use of the Robins car shakeout for unloading hopper-bottom cars in only a few minutes with a minimum of labor.

Older Employees—Guy S. Burtis, Chicago 2, "How to Avoid Losses From Employee Depreciation" discusses the problem of handling the older employee and ways in which a number of companies have solved it.

Slurry Pump—Pettibone Mulliken Corp., Chicago 51. Bulletin describes the company's new slurry pump, whose wearing parts are stated to be centrifugally cast of abrasion-resistant "Diamond" alloy. Complete detailed description, engineering and pumping data, selection chart, dimensions, assembly drawings and parts list are included. The bulletin discusses the mechanical features of the pump, including the characteristics of "Diamond" alloy, stated specifically to withstand abrasion and corrosion, provide harder, better and longer-wearing parts and to increase pump life and efficiency.

Air Compressors—Davey Compressor Co., Kent, Ohio. Leaflet describes the new "Air Chief" line of compressors, including mechanical data and specifications on complete Davey departmental units of 60, 105, 160, 210 and 315-c.f.m. capacities, as well as bare units.

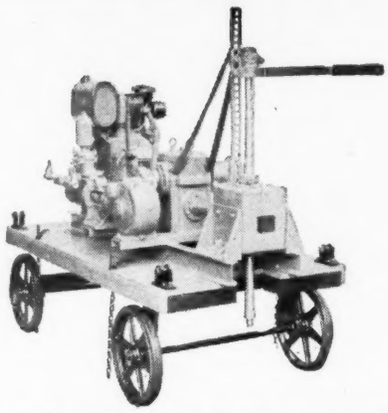
Trucks—Euclid Road Machinery Co., Cleveland 17, Ohio. Bulletins No. 216 and No. 105 describe and illustrate the 32-ton bottom-dump Euclid coal hauler and the 22-ton Model T rear-dump Euclid respectively. Design and operating features are outlined and the booklets include actual on-lot photographs.

Centrifugal Pumps—Bryon Jackson Co., Pump Division, Los Angeles 54. Bulletin No. 47-7030 covers a wide variety of centrifugal pumps used in modern mining operations, with illustrations of the pumps and installations. Capacities and head data are included under each type, together with condensed information.

Coal Preparation — Roberts & Schaefer Co., 307 North Michigan Ave., Chicago 1. Bulletin describes the new Unit Hydrotator particularly designed for small-tonnage operations. Operating details are included, along with capacities and actual operating results, and the equipment is illustrated with cross-section and flowsheet drawings.

Rubber Mats and Matting—B. F. Goodrich Co., Akron, Ohio. Bulletin covers function, construction, and specifications of the company's differ-

CORE DRILLS



- Accurate cores of coal seams by using single or double tube core barrels.
- Ideal for determining overburden before strip mining.
- Diamond—alloy or steel shot bits.
- Light weight — easy to move in rough country.

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SCRANTON 3, PA.

PRESSURE CONCRETE

(GUNITE SYSTEM)
by HUDSON RUMSEY CO., INC.

For
Repairs & Construction of
- MINE TUNNELS
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MARION 111-M

3¼-4 CU. YD. DIESEL SHOVEL

FOR LOW COST HANDLING OF HEAVY OVERBURDEN

Stability under load . . . low bearing pressure . . . remarkable speed . . . maximum maneuverability makes the MARION 111-M long-reach shovel a versatile and profitable machine for the open pit coal mine operator. It is equally at "home" piling overburden in high places as it is in digging the coal it uncovers. In addition to the above features the MARION 111-M has all-welded construction for strength—air control of all movements for ease and simplicity of operation—straight line power that reduces friction losses to a minimum—and it ships without dismounting. It is readily convertible into dragline, clamshell or crane. . .

What is your material handling problem?

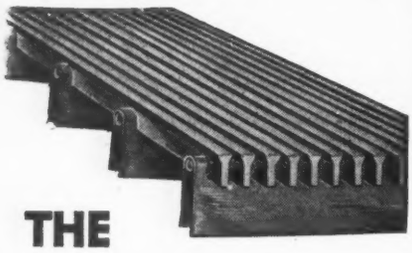
MARION

POWER SHOVEL COMPANY

MARION, OHIO, U. S. A.

Offices and Warehouses in all Principal Cities

TAPERED FOR
Maximum
EFFICIENCY



THE
WEDGE-BAR
SCREEN

Two significant features —(1) Continuous open slots over entire screen surface without any unperforated area, and (2) Downward enlargement of slots to draw off moisture, fines.

Profile B Profile C
(enlarged)

THE WEDGED SHAPED
PROFILE BAR

Note how the wedge shape permits moisture and undersize to clear quickly. No blinding or packing. U-holder supports have maximum carrying capacity, rigidity, minimum weight.

Wedge-Bar Sections are designed and fabricated to fit your equipment and do your job most efficiently. Send for data sheets so we may make recommendations. Illustrated catalog promptly on request.

Shaker Jackets • Vibrating Screen Panels • Chutes • Conveyors • Dryers

WEDGE-BAR SCREEN CORP.
640 W. 134 ST., NEW YORK 31, N. Y.

ent products in this field, including platform and standard perforated runner, multi-link and "Ezy Kleen" mattings molded and perforated door mats, shower-stall and bath, stove and drainboard and office-chair floor mats.

Office Equipment—Precision Equipment Co., Long & Schubert Aves., Chicago 39. Catalog of office equipment and furniture includes such items as steel shelving and steel storage cabinets.

Electric Controls — Westinghouse Electric Corp., P. O. Box 868, Pittsburgh 30. Booklet No. B-3649 explains how Westinghouse "Rototrol" regulates voltage, speed, current, power, speed and torque, power-factor, and position, and provides stability control and current limiting, for automatic operation of electrical equipment.

Metal Fabricating—Phillips Mine & Mill Supply Co., 2227 Jane St., Pittsburgh. Bulletin No. F-347 describes and illustrates the company's facilities for handling primary or sub-contract work in fabricating almost any metal part or product. Operations cover all types of work, including forming, bending, punching, machining, welding, etc. Illustrated are a few examples of Phillips haulage equipment and machinery and the facilities utilized in their manufacture.

High - Temperature Lubrication—Dow Corning Corp., Midland, Mich. Data Sheet No. A 20-1 offers new data on DC 710-Type silicone oils for high-temperature lubrication, especially in timing mechanisms, precision instruments, and oven conveyors.

Recorder — Wheelco Instruments Co., 847 West Harrison St., Chicago 7. Bulletin No. C2 provides design, operating and specification data on the new Wheelco "Capacilog," designed for measuring, indicating, recording and controlling functions.

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Industrial Notes

Koehler Mfg. Co., Marlboro, Mass., has announced the placing of exclusive sales distribution and servicing of Wheat electric miners lamps and Koehler flame safety lamps to the mining industry throughout the western hemisphere in the hands of National Mine Service Co., Beckley, W. Va.

Goodyear Tire & Rubber Co., Akron, Ohio, has appointed Claude E. Davis to the newly created post of field engineer in the Mid-West for its mechanical goods division. Mr. Davis will supplement the work of company engineers in Akron, aiding mechanical goods field representatives in obtaining technical on-the-job data and

RUGGED
MOISTURE-
RESISTANT

SLUSHER
BLOCKS

Check V
THESE FEATURES

- TIMKEN ROLLER BEARINGS for free running and long life under mining conditions.
- MANGANESE STEEL SHEAVES for maximum strength and minimum weight.
- ANNEALED CAST STEEL SIDES
- ALLOY STEEL heat-treated fittings which eliminate any chance of a "weakest link."
- ANTI-FOULING CONSTRUCTION with fully recessed sheaves.
- SKOOKUM BROAD THROAT construction to allow the passage of splices or fittings.

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Write for Our Catalog

SKOOKUM
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Teaching Teachers

ABOUT MINING AND MINERS

WHAT'S UNUSUAL ABOUT THESE
Three Men in a Boat?
BITUMINOUS COAL
BITUMINOUS COAL . . . LIGHTS THE WAY . . . FUELS THE FIRES . . . POWERS THE PROGRESS OF AMERICA

Teachers are ever on the alert for more facts about the industries that make America. From these facts as presented in the classroom, the pupils take away lasting impressions—impressions that in many cases will influence the children in their lifetime thinking.

To give teachers the facts about the coal industry and how coal miners live, Bituminous Coal Institute presents informative, useful messages in advertisements to teachers—in magazines that teachers read. Free booklets are also offered—booklets the teacher can use to advantage in preparing talks and projects for pupils. Both advertisements and booklets help to promote a clearer understanding of conditions as they actually exist in the coal mining industry today.

This pointed, persuasive campaign is but one of the many public relations activities conducted by the Bituminous Coal Institute for the benefit of our industry. With four years of accomplishment behind it, and with plans for an active future, Bituminous Coal Institute deserves the full support of every forward-looking bituminous coal operator.

BITUMINOUS COAL INSTITUTE

Washington, D. C.

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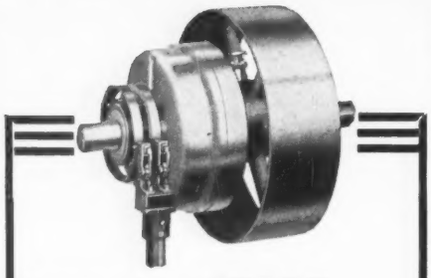
BITUMINOUS COAL . . . LIGHTS THE WAY . . . FUELS THE FIRES . . . POWERS THE PROGRESS OF AMERICA

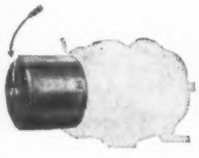


Smooth START
Smooth STOP
with STEARNS Magnetic
CLUTCHES
Clutch-Brake Units
Magnetic Disc BRAKES

Automatic near or remote control of starting and stopping in your transmission layout is easy with Stearns Magnetic friction devices. Build them into your machinery.

Write for our Bulletin 226 on clutches and 604 on brakes. Consult Stearns Magnetic engineers giving details of your problem, drawings, torque and duty information and other data.

Compact simplified design, powerful magnetic action, low initial and maintenance cost makes Stearns Magnetic friction units your best bet for transmission and machinery control.



The magnetic brake with the lining wear indicator and manual release — distinctive, original.

STEARNS
MAGNETIC Mfg. Co.
661 S. 28th St., Milwaukee 4
MAGNETIC SEPARATORS
PULLEYS - DRUMS - CLUTCHES

supervising the installation of conveyor belts in mines and other operations, with headquarters in St. Louis.

Fairbanks, Morse & Co., Chicago, has named L. A. Weom manager of its pump division, succeeding Arnold Brown, resigned. Mr. Weom, who was formerly manager of the pump and electric department of the St. Paul branch, has been associated with Fairbanks, Morse & Co. since 1929.

Link-Belt Co., Chicago, has appointed Albert Musschoot formerly a member of the general engineering staff at Philadelphia, assistant to the chief engineer, with headquarters at the company's general office.

Pittsburgh Gear & Machine Co., Pittsburgh, has appointed **Rogan & Rogan Co., Middlesboro, Ky.**, as distributor of "Genuine Pittsburgh Gears." William J. Monaghan, Morgantown, W. Va., has been placed in charge of coal sales for Pittsburgh Gear in central and western Pennsylvania, eastern Ohio and northern West Virginia. James Lawless, Bluefield, W. Va., has been named to cover coal mine sales in southern West Virginia, eastern Kentucky, Virginia and Tennessee.

Kennametal Inc., Latrobe, Pa., has appointed Robert T. Smith, Glenshaw, Pa., to cover the State of Ohio as sales representative. Thomas C. Miller, Pikesville, Ky., has been named sales representative for eastern Kentucky.

Lima Locomotive Works, Inc., Shovel and Crane Division, Lima, Ohio, has named Fred L. Maus district manager at Memphis, Tenn., succeeding G. L. Lillard, deceased. R. A. "Bob" Otterness, former sales representative in the southwestern and northwestern territory, has been appointed to succeed Mr. Maus at Dallas as district manager at Dallas, Tex.

Gar Wood Industries, Inc., has named E. D. Wallace sales manager of its Buckeye Traction Ditcher Division at Findlay, Ohio. Mr. Wallace has had more than 20 years experience with heavy construction equipment, the last ten of which have been with Buckeye as a district representative. W. C. Petersen has been appointed service manager of the division.

Twin Disc Clutch Co., Racine, Wis., has named Roger G. DeLong, manager, and W. B. Gibson, sales manager, of its Hydraulic Division in Rockford, Ill. Mr. DeLong has been serving as both acting manager and sales manager of the Rockford division. Mr. Gibson has been assistant district manager of the eastern territory.

International Harvester Co., Chicago, has appointed Laird A. Hanson supervisor of parts and service merchandising for its motor truck division.

FOR SAFETY'S SAKE, SUPERIOR COUPLINGS

Drop Forged Links

Drop forged for strength, Superior Swivel and Single Link Couplings are built to stand the gaff. No welds to let go with resulting wrecks. Superior Couplings on your mine cars will prevent accidents and reduce haulage costs. Order Superior Couplings for your replacements and specify them on new equipment.

DROP FORGED SWIVEL COUPLINGS

PITTSBURGH
KNIFE & FORGE CO.
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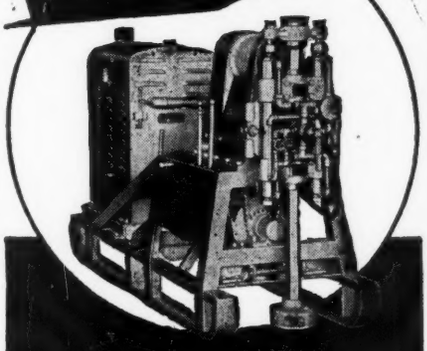
Pittsburgh 12, Pa.

Diamond Core Drilling
CONTRACTORS



Testing mineral properties with our light gasoline drills. SATISFACTORY COAL CORES GUARANTEED. Ground solidification by our pre-pressure grouting method for shafts. Wet mine areas, horizontal holes for drainage. Electric drills for inside mine drilling.

MOTT CORE DRILLING CO.
HUNTINGTON • WEST VIRGINIA

Wickwire Rope is "Tissue Tested"

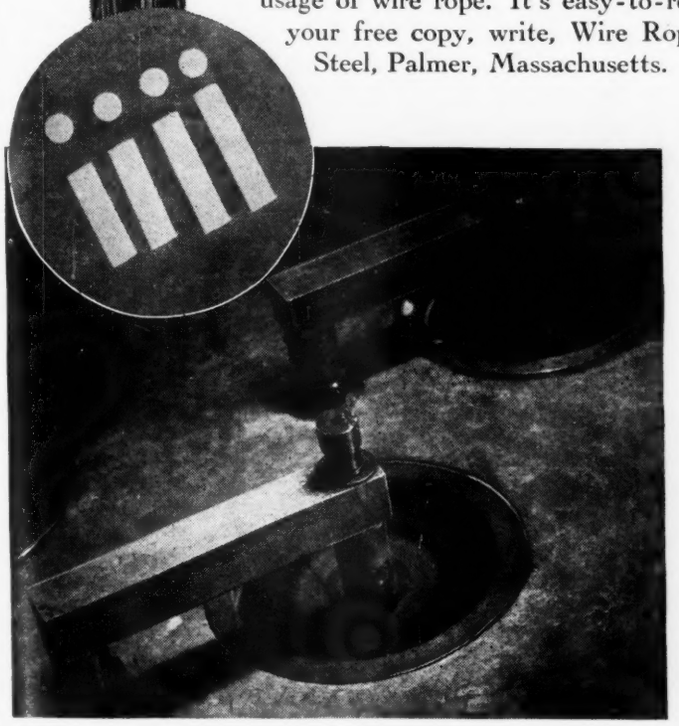
With the same scientific care a physician uses in examining human tissue, technicians in the Physical Testing Laboratory of Wickwire Spencer's Rope Mill test samples of wire imbedded in plastic "buttons." Samples from coils of wire are ground, polished, etched, microscopically examined and the findings recorded.

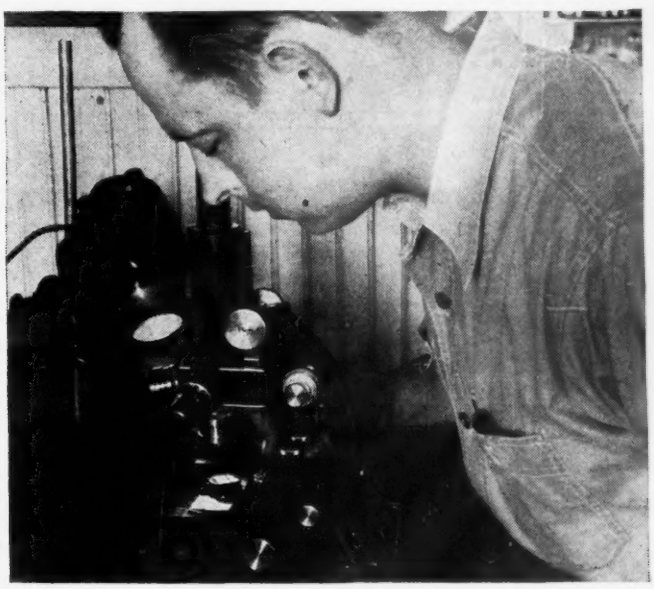
What's this got to do with wire rope? The grain size has an important bearing on the life span of the wire. Because the quality of the steel in the rope wire is just as important for dependable service as is the construction of the rope, Wickwire uses only such wire as passes the Physical Testing Laboratory's exacting standards.

For the utmost in performance, safety and long life, specify Wickwire Rope. It is available in all sizes and constructions, both regular lay and WISSCOLAY *Pre*formed. Call on Wickwire distributors and Wire Rope engineers to help solve your wire rope problems and supply the right rope for your needs.

HOW TO PROLONG ROPE LIFE AND LESSEN ROPE COSTS

Thousands of wire rope users have found that the information packed in the pages of "Know Your Ropes" has made work easier and rope last longer. It's full of suggestions on proper selection, application and usage of wire rope. It's easy-to-read and profusely illustrated. For your free copy, write, Wire Rope Sales Office, Wickwire Spencer Steel, Palmer, Massachusetts.





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A PRODUCT OF THE WICKWIRE SPENCER STEEL DIVISION OF THE COLORADO FUEL AND IRON CORPORATION

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PACIFIC COAST SUBSIDIARY—The California Wire Cloth Corporation, Oakland 6, California

General Tire & Rubber Co. has appointed Glenn E. Curtis territory representative for Colorado, with headquarters in Pueblo.

Aircraft Standard Parts Co. Div., Breeze Corporations, Inc., Rockford, Ill., has recently moved its general offices to those of the parent company in Newark, N. J. The move has been made, according to the company, to further utilize the increased sales and manufacturing facilities of the Breeze organization.

Eutectic Welding Alloys Corp., New York, recently announced completion of peacetime centralization of output and research in a Manhattan plant capable of turning out 90 special types of welding rods valued at $10,000,000 annually during ceremonies inaugurating the new facility. Production machinery and equipment layout in the new plant occupies 37,000 sq. ft., including air-conditioning and dehumidification chambers for rod flux-coating processes.

Raybestos-Manhattan, Inc., Asbestos Products Division, Manheim, Pa., has appointed David E. Gow packing sales manager, with headquarters in Manheim. Mr. Gow, who has been with Raybestos-Manhattan, Inc., for a number of years and was formerly branch manager of the Cleveland office of Asbestos Textile & Packing Division of the company, succeeds Jack E. Cole, transferred to Chicago branch manager of the Equipment Sales Division.

Metal & Thermit Corp., New York, has appointed O. L. (Duke) Howland sales manager of its welding division, with headquarters at 7300 So. Chicago Ave., Chicago. Wm. C. Cuntz has been named assistant sales manager, as aide to Mr. Howland, with headquarters at 1514 W. North Ave., Pittsburgh, Pa.

Dravo Corp., Keystone Div., Pittsburgh, has elected William E. Clark, general manager of the division, a vice president of the corporation.

R. G. LeTourneau, Inc., Peoria, Ill., has announced several changes in the executive staff, following completion of the first phase of its reconversion program. These changes include advancement of Roy E. McCluskey from assistant treasurer to vice president in charge of sales, and the resignation of Robert F. Nelson as vice president and assistant to the president. Mr. Nelson continues, however, as a member of the board of directors.

United States Rubber Co. has appointed H. Barden Allison sales manager for the Gilmer Division, V-belt manufacturing and distributing unit in Philadelphia. Mr. Allison is succeeded as district sales manager for mechanical goods at Cincinnati, Ohio, by Ralph W. Stambaugh, district salesman. Other changes in the company's mechanical goods sales organization include appointments of Purdy Miller, Buffalo district sales manager, as sales manager for the Indianapolis district. Mr. Miller is succeeded at Buffalo by N. W. Swenson. Paul S. Bigby, Detroit assistant district sales manager, has been appointed Milwaukee district sales manager.

Hewitt-Robins, Inc., Hewitt Rubber Division, Buffalo, N. Y., has appointed the McJunkin Supply Co., Inc., Charleston, W. Va., as a distributor of the entire Hewitt line of industrial hose, belting and packing. With a sales force of 18 men, McJunkin operates branch sales offices and warehouse facilities in Allen, Ky.; Hamlin, W. Va.; and Marietta, Ohio, in addition to its own machine shop and fabricating plant in Charleston. Hewitt stocks are carried at all locations.

Buda Co., Harvey, Ill., has named Harry G. Campbell sales manager of the company's "DieseLight" division.

Koppers Co., Inc., has appointed Dr. Charles F. Winans, chemical director since last January, plant manager for the Pennsylvania Coal Products plant, a department of the Koppers Chemical Division, Petrolia, Pa.

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ENGINEERS AND BUILDERS OF MODERN COAL OPERATION
Authoritative Valuations, and Reports of Mining Properties Equipment and Operation.
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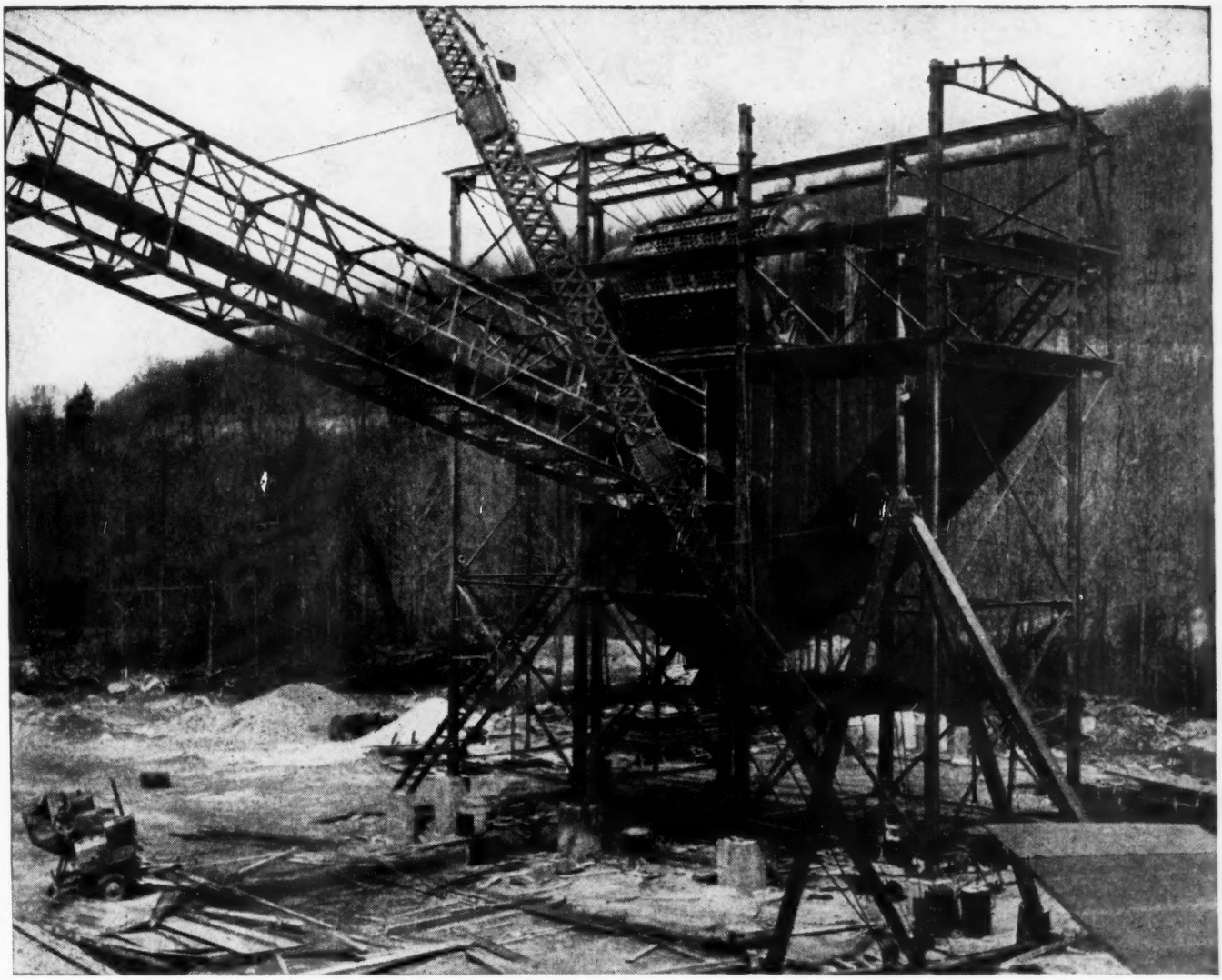
Consulting Engineers can give needed advice regarding most any problem for they see each separate department in its relation to the whole plant—and they sell nothing but their broad experienced services.



7 "PENNSYLVANIA" BRADFORDS

Into Operation This Year for Conditioning ROM at the Mine

Seven big "Pennsylvania" Bradfords, roller mounted type, have gone into production at as many mines this past year . . . and more are building or in course of erection. These are single unit installations . . . no "emergency" equipment was considered necessary by the engineers.

There are good reasons for this preference for "Pennsylvania" Bradfords. These Breakers make full seam mining practical and economical. They reduce conditioning costs by crushing, screening and scavenging in a single operation, at lowest possible labor and maintenance costs. They deliver no oversize and few fines, free from mine debris . . . hard rock, sulphur balls, tramp iron, mine timbers . . . all refuse except that small enough to go through the Breaker screen. They ease the load on the washing plant, help speed output and lower cost of this operation.

We will be happy to consult with you, help determine your requirements and make recommendations . . . show how a "Pennsylvania" Steelbuilt Bradford can save real money for you.

PENNSYLVANIA CRUSHER COMPANY

Liberty Trust Bldg. Philadelphia 7, Pa.

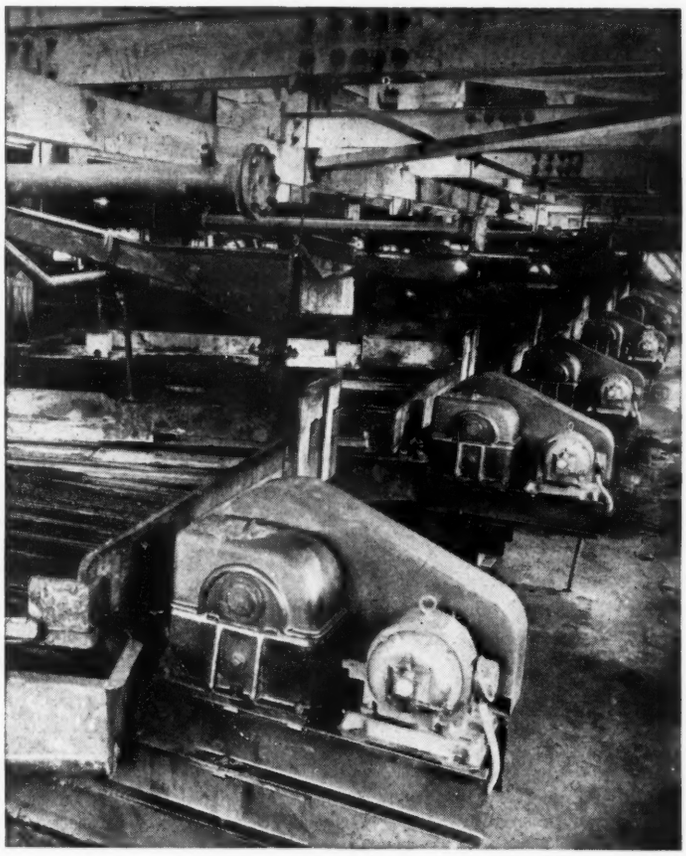
New York • Pittsburgh • Chicago • Los Angeles • Birmingham

Associated with Fraser & Chalmers Engineering Works, London

"PENNSYLVANIA" STEELBUILT

BEARINGS On Head Motions

● *Built by The Deister Concentrator Co.*



In the Praco Plant of the Alabama By-Products Corporation, sixteen Super-Duty Diagonal-Deck Coal Washing Tables operate day after day at high capacity. On each is a Concenco Head Motion that has vital rotating parts dependent upon SKF Bearings. On the pitman and main shaft, SKF Bearings assure smooth, continuous performance that's reflected in consistently high production schedules. In addition, they cost practically nothing to maintain . . . need no adjustment . . . require only a little lubricant now and then. The simple statement "SKF-equipped" is your warranty that the right bearings are in the right places. 6332

SKF INDUSTRIES, INC.
Front St. and Erie Ave., Phila. 32, Pa.

FOR DEPENDABLE, LOW-COST HAULING...

get a "Job-Rated" truck like this

Are YOUR hauling costs too high? Are your trucks "gas-eaters"—or in the repair shop too often?

If so—perhaps it's time for new equipment . . . better equipment that *fits* your job.

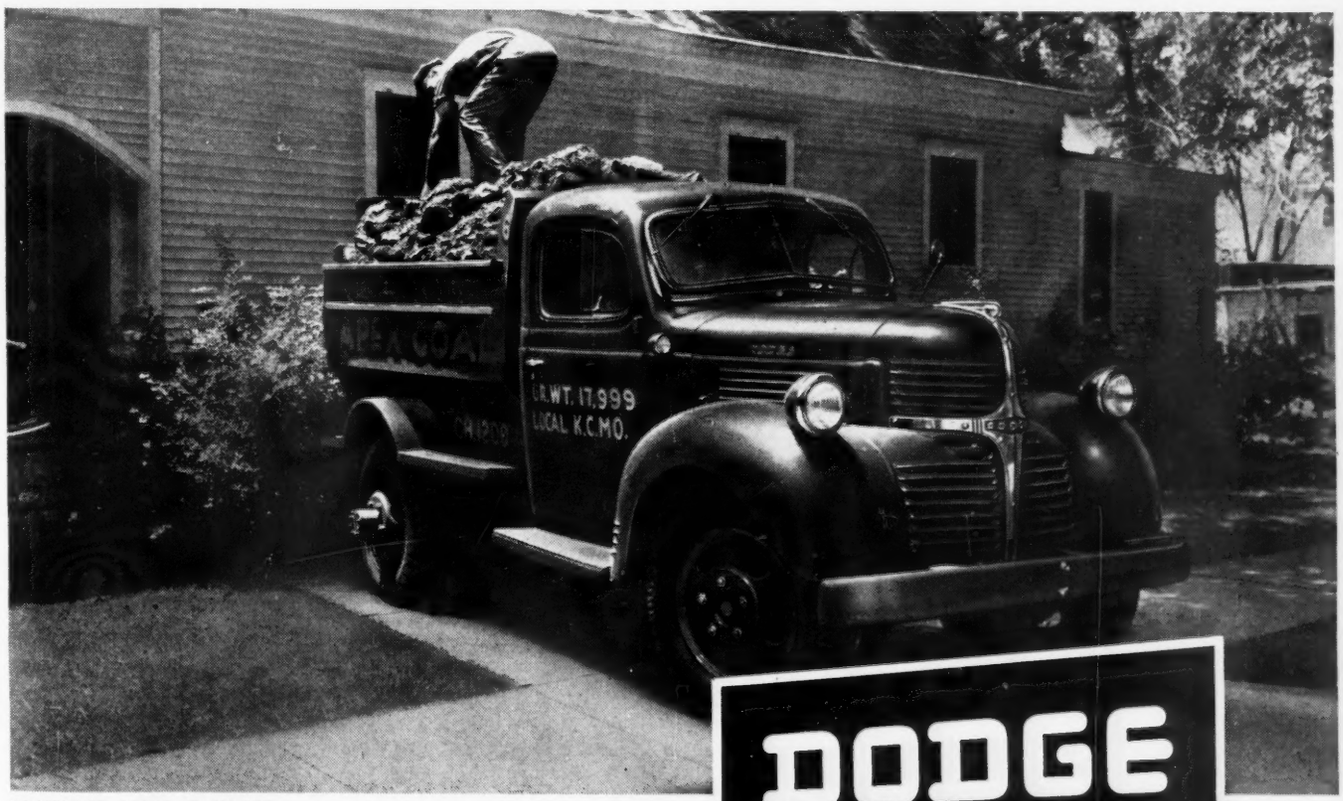
It stands to reason that a "*Job-Rated*" truck that FITS your loads and your operating conditions—will give better performance, enable you to give better service to your customers, and operate at lower cost.

Such a truck will have "*Job-Rated*" power—the right one of 7 great Dodge truck engines for power *plus* economy. It will have exactly the right clutch, transmission, rear axle—the right units throughout—for longer-lasting, more dependable service.

To make sure that your next truck is "*Job-Rated*" to handle your loads over your roads—simply explain your hauling requirements to your Dodge dealer . . . and he will select the right Dodge "*Job-Rated*" truck for *your* job.

★ ★ ★

Your Dodge dealer is interested in your continued satisfaction: *First*, by selling you a truck that fits your job; *Second*, by giving you dependable Dodge truck service; *Third*, by providing you with truck parts that are identical with original Dodge "*Job-Rated*" truck parts.



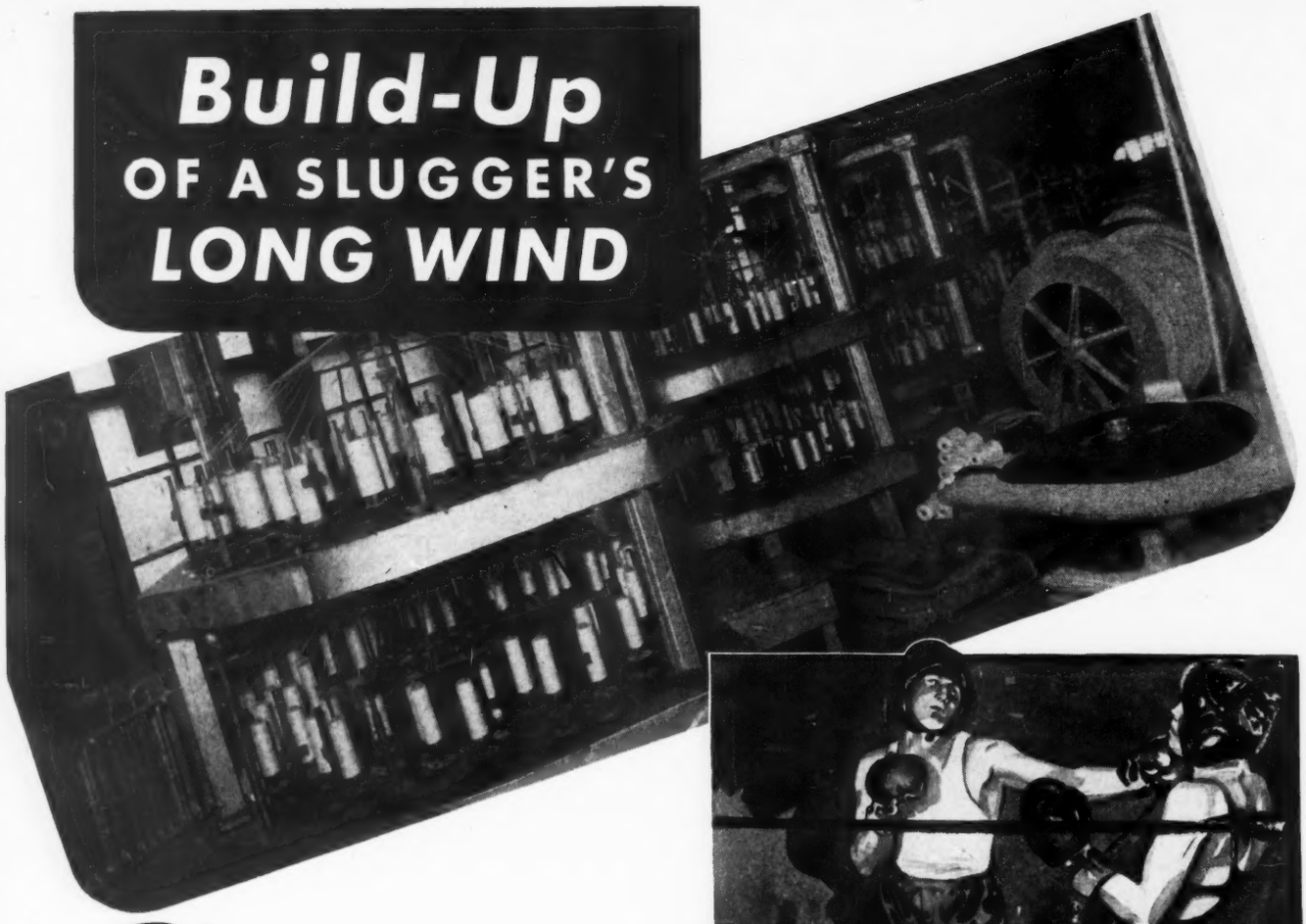
ILLUSTRATED: MODEL WF, 1½-TON.

DODGE

ONLY DODGE BUILDS "*Job-Rated*" TRUCKS

Fit the Job . . . Last Longer!

Build-Up OF A SLUGGER'S LONG WIND



The SCENE in the Republic plant shows special cords being braided into seamless, tubular plies —one over the other—around a Tower Pneumatic Hose tube. A layer of rubber is inserted between plies, thoroughly impregnating the cords when subjected to heat and pressure during final vulcanization of the hose. This is the build-up of a slugger's long wind. The scientifically developed and controlled process gives Tower its strength and resilience for the job of slugging it out with rock formations in pneumatic tool service. It is this powerful but lightweight and flexible reinforcing body that makes it possible for Tower to stand up longer under continuous high pressures and racking pulsations.

More Service from RUBBER for Industry

See your nearby Republic Distributor

REPUBLIC RUBBER

DIVISION

LEE RUBBER & TIRE CORPORATION

YOUNGSTOWN 1, OHIO

REPUBLIC INDUSTRIAL PRODUCTS
YOUNGSTOWN, O.

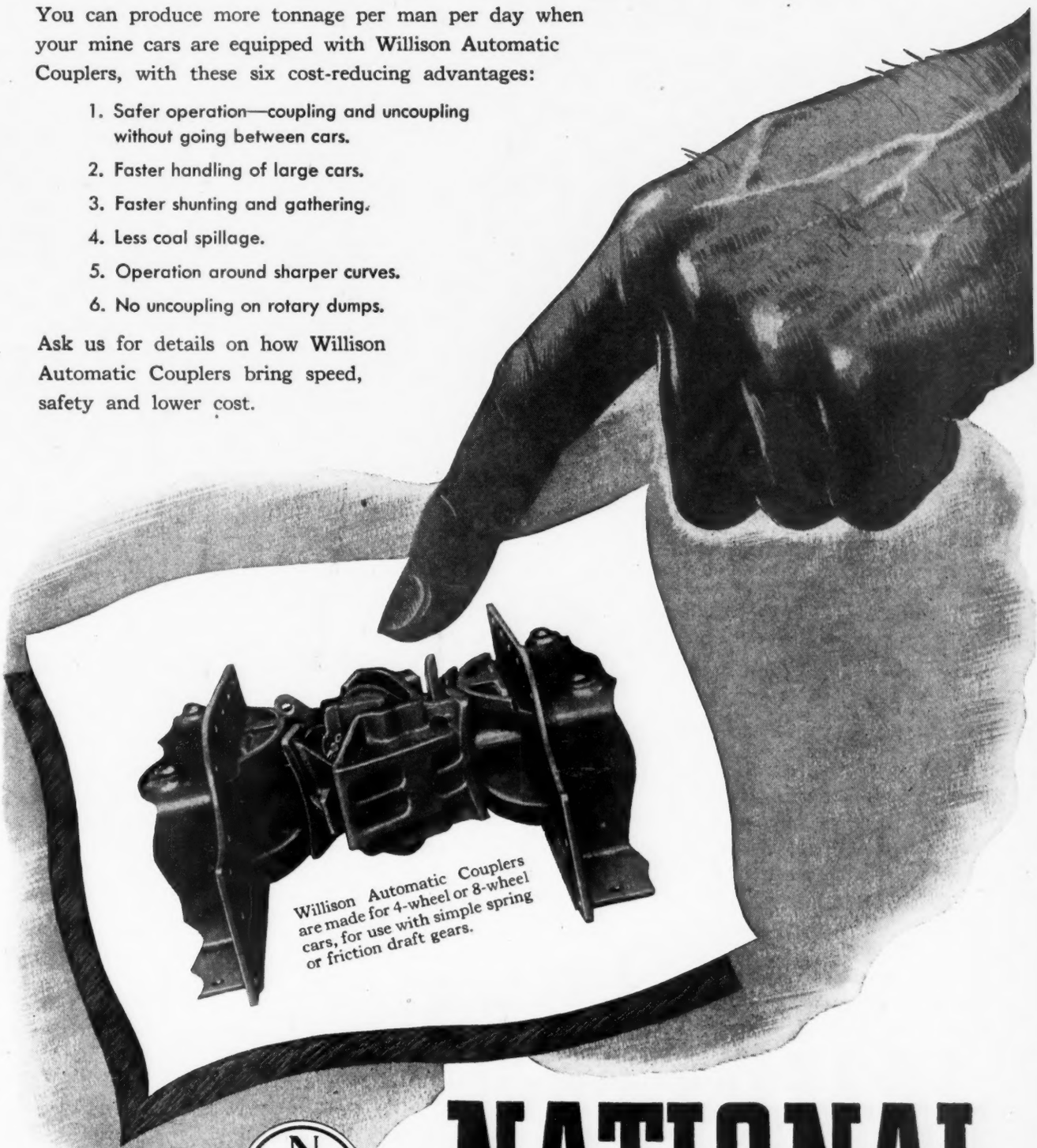
LEE DELUXE TIRES AND TUBES
CONSHOHOCKEN, PA.

ONE ANSWER to rising costs

You can produce more tonnage per man per day when your mine cars are equipped with Willison Automatic Couplers, with these six cost-reducing advantages:

1. Safer operation—coupling and uncoupling without going between cars.
2. Faster handling of large cars.
3. Faster shunting and gathering.
4. Less coal spillage.
5. Operation around sharper curves.
6. No uncoupling on rotary dumps.

Ask us for details on how Willison Automatic Couplers bring speed, safety and lower cost.



Willison Automatic Couplers are made for 4-wheel or 8-wheel cars, for use with simple spring or friction draft gears.

ESTABLISHED 1868

NATIONAL

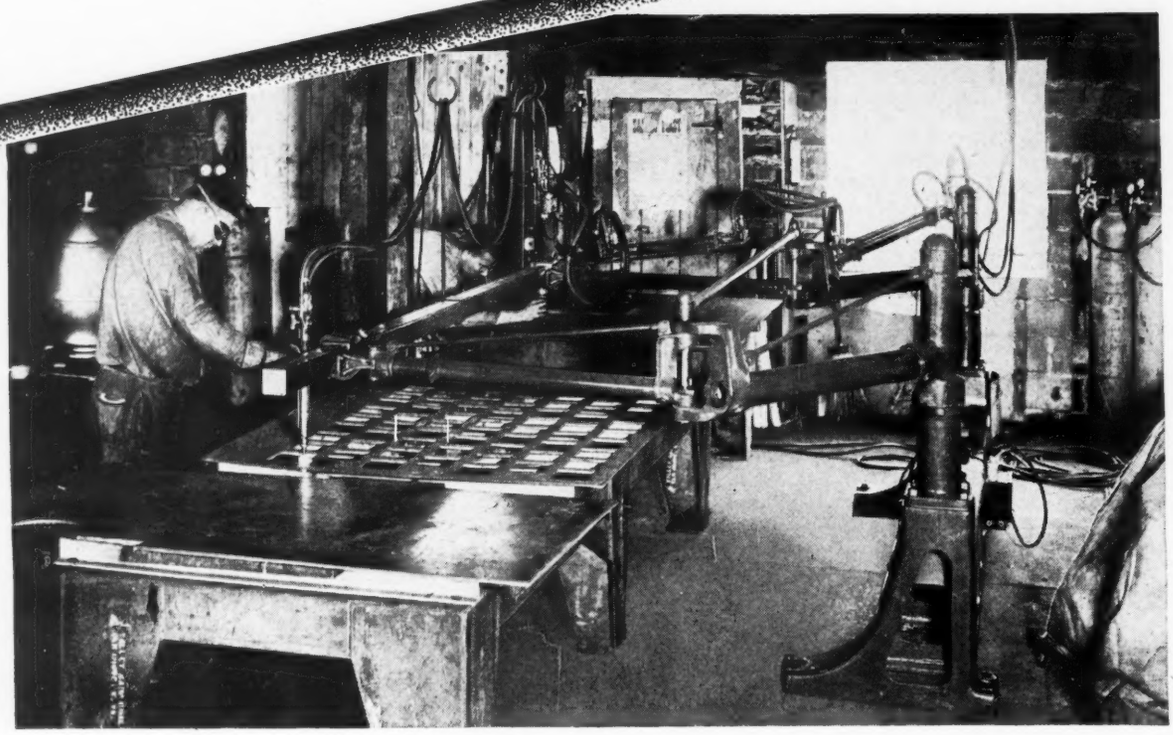
MALLEABLE and STEEL CASTINGS CO.

Cleveland, Ohio

SALES OFFICES: Cleveland, Chicago, New York, Philadelphia, Richmond, San Francisco, Sharon, Pa., St. Louis • WORKS: Cleveland, Chicago, Indianapolis, Melrose Park, Ill., Sharon, Pa.

Repair, Rebuild, Fabricate

efficiently and at low cost



with welding and flame cutting equipment

The continuous wear to which mine equipment is subjected decreases operating efficiency, and is costly in the high replacement of parts. Many mines are solving this problem by the full use of the oxyacetylene flame and electric arc in maintenance and fabrication work.

For example, a flame-cutting machine in one colliery is used to cut grading screens from steel plate . . . equipment that can often be made at less cost than a new replacement.

Also, this flame cutting equipment is used to shape steel sheet and plate for mine cars . . . and together with the electric arc helps to build new sections or entire bodies . . . reduces "down time" on machines for which repair parts are not readily available . . . eliminates the necessity of having capital tied up in large stocks of spare parts – they can be made as needed in repair shops.

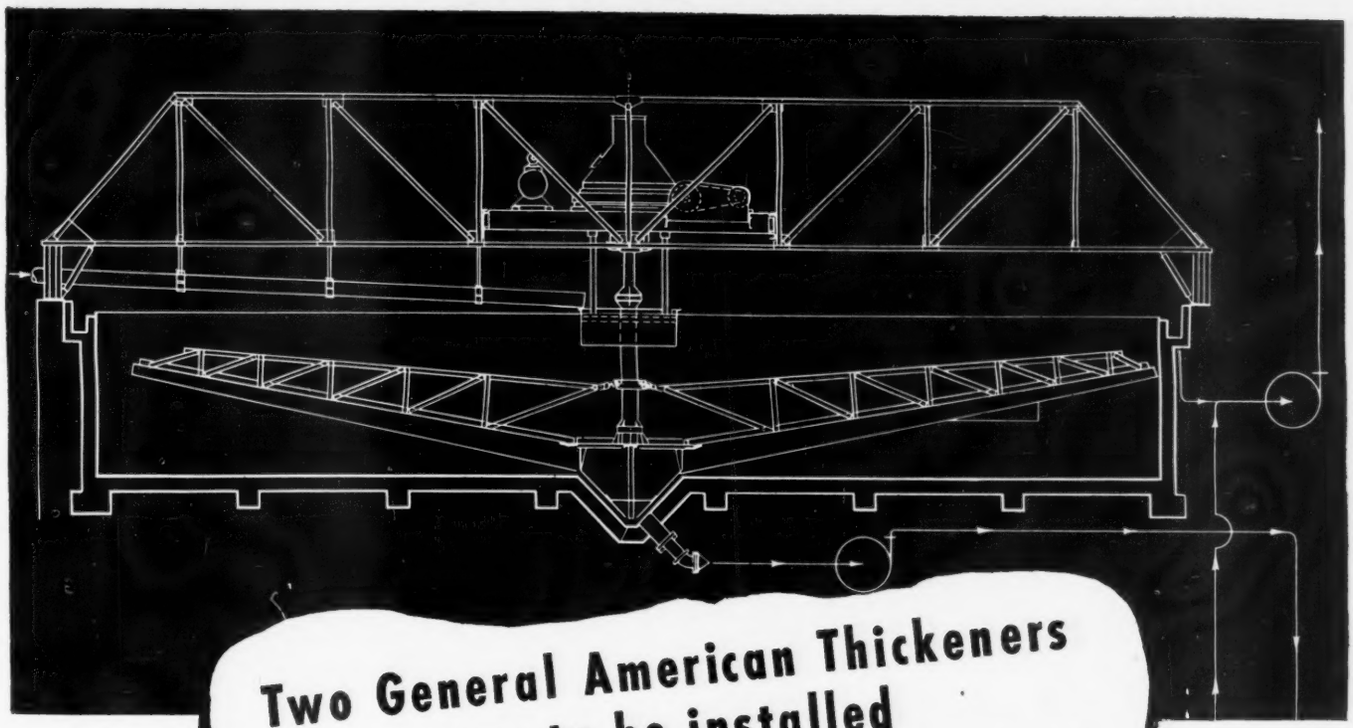
These are just a few of the many profitable Airco oxyacetylene flame and electric arc applications in and around mines. Others include welding of rail ends to form one continuous rail . . . flame hardening of machine parts . . . rebuilding of worn surfaces . . . hard facing of equipment subjected to wear . . . and numerous other repair jobs.

For further information about these cost-cutting, time-saving processes write for the explanatory article — "Welding, Flame Cutting For Efficient Maintenance and Low Cost". Address: Dept. CA-6023, Air Reduction, 60 East 42nd St., New York 17, New York. In Texas: Magnolia Airco Gas Products Company, Houston 1, Texas. Represented Internationally by Airco Export Corporation.

AIRCO **AIR REDUCTION**

Offices in All Principal Cities

HEADQUARTERS FOR OXYGEN, ACETYLENE AND OTHER GASES...CARBIDE...GAS WELDING AND CUTTING APPARATUS AND SUPPLIES...ARC WELDERS, ELECTRODES AND ACCESSORIES



Two General American Thickeners are to be installed in the new coal washing plant at

Robena

THE WORLD'S LARGEST COAL MINE

THESE THICKENERS were selected after a careful study of the performance of a General American thickener at another coal mine.

Their completely automatic and practically fool-proof operation was convincing evidence of their ability to deliver long time trouble-free performance.

The special hydraulic lift makes a virtually "choke-proof" machine, permitting shut-downs without recirculation, and starting under a full load. The thickener will never stall in the event of a power failure. Where operation is such that surges of fine coal occur, the thickener will handle them automatically.

A General American engineer will be glad to assist you in designing new units or modernizing your existing coal dewatering plant.

★ ★ ★ ★ ★

OTHER GENERAL AMERICAN PRODUCTS

Dryers	Bins	Turbo Mixers
Filters	Storage Tanks	Ladles
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OFFICES: Chicago, Sharon, Louisville, Orlando, Washington, D. C.
Pittsburgh, St. Louis, Salt Lake City, Cleveland.

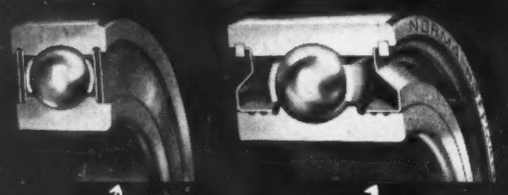
GATX GENERAL AMERICAN

"If it isn't Wide Enough It isn't Good Enough"

...TO MEET TODAY'S PROBLEMS

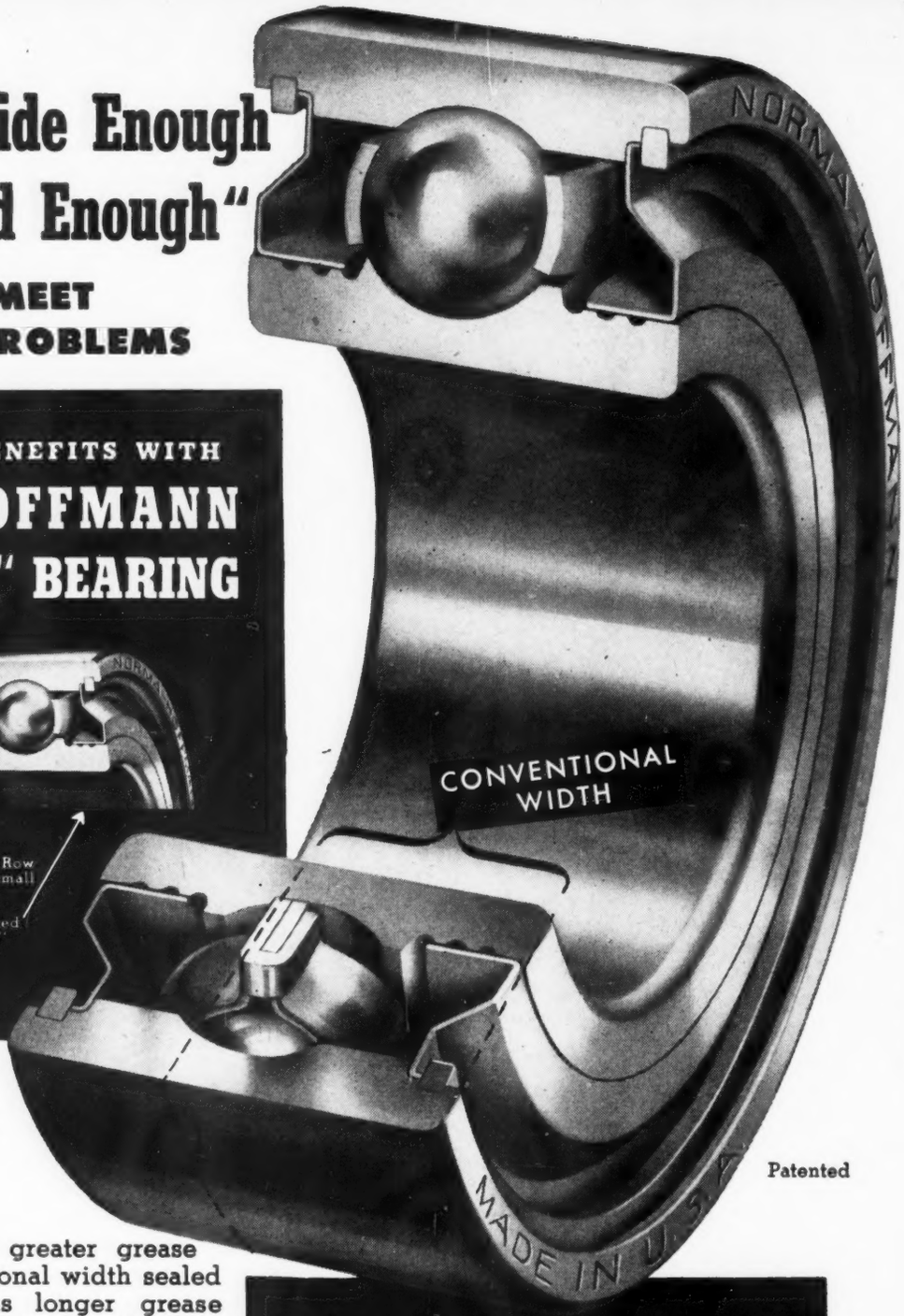
GET 3 DESIGN BENEFITS WITH

NORMA-HOFFMANN "CARTRIDGE" BEARING



CONVENTIONAL Single Row Width sealed bearing has small grease capacity.

NORMA HOFFMANN patented double row width "Cartridge" Bearing has 100% greater grease capacity.



Patented

Here's What You Get

1. **Longer Life** A 100% greater grease capacity than conventional width sealed bearings. This means longer grease life... longer periods between relubrication—because a large volume of grease does not oxidize or dry out as readily as a thin film of grease.
2. **Greater Contact Area** 43% to 85% greater contact area between shaft and bearing bore and between housing and bearing O.D., as compared to conventional width bearing. This eliminates need for locknuts and results in greater shaft strength as it is unnecessary to cut locknut threads. Slippage and peening are also prevented.
3. **Full Load Carrying Capacity** Unlike many other sealed bearings, *full size* balls are used; hence, there is no reduction in load carrying capacity.

America's No. 1 SEALED BEARING by NORMA-HOFFMANN

NORMA-HOFFMANN BEARINGS CORPORATION, STAMFORD, CONNECTICUT

FIELD OFFICES New York, Chicago, Cleveland, Detroit, Pittsburgh, Cincinnati, Los Angeles, San Francisco, Seattle, Phoenix

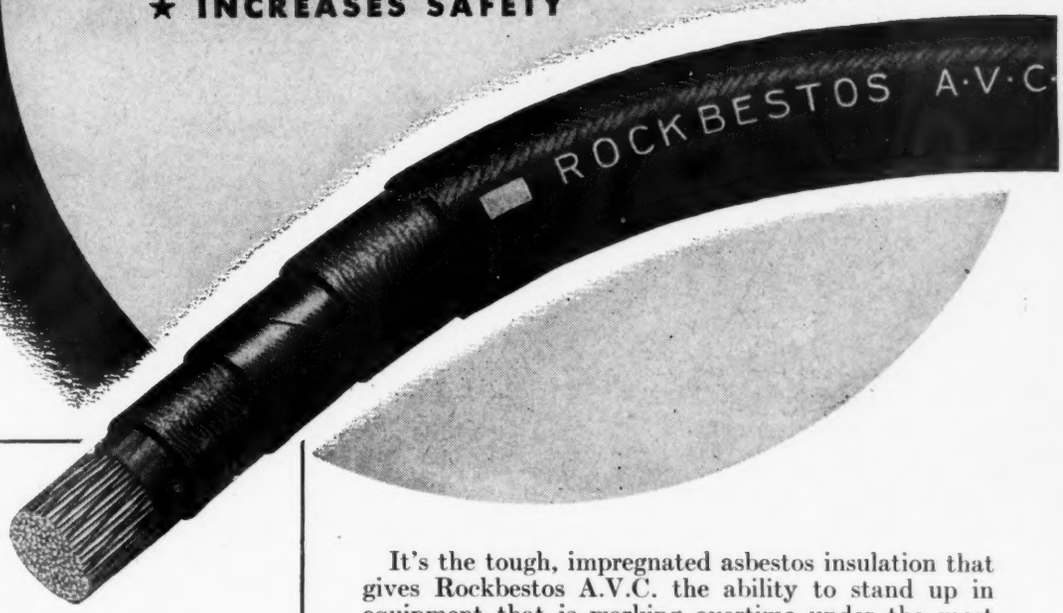
THE

PERMANENT ASBESTOS INSULATION

IN THE ORIGINAL

ROCKBESTOS A.V.C. Mining Cable

★ STEPS-UP EQUIPMENT PRODUCTION
★ REDUCES MAINTENANCE COSTS
★ INCREASES SAFETY



CHECK THESE Permanently Insulated Rockbestos Advantages

- It is made to fit bushings properly.
- The impregnated asbestos yarn braid is heatproof, flameproof and resistant to moisture, oil, grease and alkalies.
- The felted asbestos insulation beneath, impregnated with heat, flame and moisture resisting compounds like the braid, won't bake out, crack, flow or burn.
- Asbestos-protected varnished cambric supplies high dielectric strength and added moisture resistance.
- The inner impregnated asbestos insulating wall won't get brittle or crack under conductor-heating overloads and won't burn even though the copper melts.
- The paper separator prevents the insulation from sticking to the conductor and makes stripping easier.

This construction is one of 125 developed by Rockbestos for severe operating conditions.

It's the tough, impregnated asbestos insulation that gives Rockbestos A.V.C. the ability to stand up in equipment that is working overtime under the most severe operating conditions.

Used for motor leads, coil and grid connections, Rockbestos A.V.C. failure-proofs internal circuits . . . keeps cutters, loaders and locomotives on full-time operating schedules.

Because the asbestos insulation is heatproof and highly resistant to oil, grease, moisture and other failure-causing elements, it keeps your machines and locomotives out of the repair shops and practically eliminates wire maintenance expense.

Asbestos insulated Rockbestos A.V.C. is flame-resistant too. It increases safety and reduces expense because it won't ignite, burn or carry flame.

Keep your equipment *on the job* and take out more coal with the cable used by leading mining machine manufacturers since 1928. Bulletin No. 30-C tells all about it. Write for a copy and a sample.

ROCKBESTOS PRODUCTS CORPORATION, Box 1102, New Haven 4, Conn.

ROCKBESTOS A.V.C. *The Cable with Permanent Insulation*

ORDER FROM THESE JOBBERS—SPECIFY "ROCKBESTOS" A.V.C.

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GUARANTEED

. . . to outdig any dragline bucket at any depth!

When properly used Page AUTOMATIC Buckets will outdig ordinary buckets of comparable size.

That's a guarantee you can easily prove for yourself by a competitive test. Compare the production of your present bucket with that of an AUTOMATIC. Hundreds of dragline operators in all kinds of digging have found that their AUTOMATIC buckets dig more yards at a lower cost per yard than any other dragline bucket they have ever used.

Here's why: Page AUTOMATICS dig right in at the first pull on the load line and get a full pay load within one to three bucket lengths regardless of the depth — 20 ft., 100 ft. or more. This means that most of your operations are under or near the end of the boom point where the minimum amount of power is required for hoisting the load. Perfect balance of the AUTOMATIC assures perfect control whether loading or dumping. Quick loading features of AUTOMATIC buckets mean less wear and maintenance on the bucket, cables and the dragline as well as minimum operator fatigue. For more complete details, see your own construction equipment distributor or write for new booklet "How to Get the Most Out of Your Page Automatic Dragline Bucket."

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PAGE *Automatic*
DRAGLINE BUCKETS *and* WALKING DRAGLINES

Write for this new folder . . .

Two men and the "Canton" make track-cleaning a pleasure---dig and clear 1 ton per minute of lumps and impacted track rubble, as proved in months of tests. Like all Canton Mine devices, pays for itself quickly. This folder should be on every mine executive's desk . . . may we send it to you . . . write

AMERICAN MINE DOOR CO.
2061 DUEBER AVENUE,
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Approximately 21,500,000 feet

Price $.015 per foot, f. o. b. location

Continuous Sale

NO PRIORITY NEEDED

GOVERNMENT OWNED SURPLUS

PRIMACORD is a commercial detonating fuse used for firing high explosive blasting charges. It consists of an explosive core of PETN contained within a flexible, waterproofed fabric covering. It is about ¼" in diameter, weighs approximately 15 pounds per 1,000 feet, and has a tensile strength of 113 pounds. PRIMACORD is an extremely effective detonating agent due to the fact that PETN is a forceful explosive with a velocity of 20,350 feet per second.

PRIMACORD is a relatively safe detonant, is easy to handle, comparatively insensitive to shock, friction, or flame, and both the covering and the explosive core are water-resistant. It can be fired by either an electric or non-electric blasting cap.

Packaged—On wooden spools in lengths of 50 and 100 feet.

Minimum Quantity—5,000 feet.

Price—1½¢ per foot, f.o.b. location.

★ ★ **IMMEDIATE DELIVERY** ★ ★

This inventory is located in the following War Assets Administration Regional areas in the approximate quantity stated. Offers to purchase may be made by letter, wire or personal visit to any WAA Customer Service Center. If your offer is written, mark your envelope, "Offer to Purchase Primacord, A-113-2058"

WAA also has available TNT AND DEMOLITION BLOCKS, electric and non-electric blasting caps.

WAA OFFICES	50′ SPOOLS	100′ SPOOLS	TOTAL FEET
Chicago	118		5,900
Cincinnati	6,818	27,654	3,106,300
Denver	8,000	16,213	2,021,300
Grand Prairie	613	.....	30,650
Los Angeles	19,894	14,838	2,478,500
Nashville	17,172	10,381	1,896,700
New York	35,370	29,969	4,765,400
Omaha	808	623	102,700
Philadelphia	6,425	.....	321,250
Salt Lake City	34,270	44,630	6,176,500
San Francisco	88	6,017	606,100
	129,576	150,325	21,511,300

Purchasers of Primacord are required to observe all laws regulating the sale, use, handling and storage of explosive materials.

OFFICE OF GENERAL DISPOSAL

WAR ASSETS ADMINISTRATION

Offices located at: Atlanta • Birmingham • Boston • Charlotte Chicago • Cincinnati • Cleveland • Denver • Detroit • Grand Prairie, Tex. Helena • Houston • Jacksonville • Kansas City, Mo. • Los Angeles • Louisville • Minneapolis Nashville • New Orleans • New York • Omaha • Philadelphia • Portland, Ore. • Richmond St. Louis • Salt Lake City • San Antonio • San Francisco • Seattle • Spokane • Tulsa

Customer Service Centers in these and many other cities.

USES

PRIMACORD
is used as a detonating fuse for TNT, demolition blocks or other explosives and is more dependable than electrical fuses for insuring the simultaneous detonations of a number of charges assembled on a single line.

SUBSTITUTE FOR BLASTING CAPS
Primacord has already obtained widespread favor as a substitute for blasting caps because of its ease of handling, its relative insensitivity, and its efficiency.

FIRE FIGHTING
Small trees can be felled merely by wrapping a few loops around each tree and detonating.

DIGGING POST HOLES
Primacord can enlarge a small hole rapidly and cleanly, and consequently is most useful in telephone and telegraph line construction.

CONTROL OF PINE BARK BEETLE
One loop of Primacord around a tree, upon detonation, will strip the bark from the tree.

DRAINAGE OPERATIONS
Primacord is more effective than dynamite for running ditches through hard, dry ground.

HOW TO BUY

Orders to purchase all or any part of the above material, f.o.b. location, will be accepted by any Customer Service Center. WAA reserves the right to reject any or all orders.

This is a continuous sale. All orders received will be filled without regard to priorities; priority purchasers have already had an opportunity to fulfill their requirements: Purchaser's order must state thereon: (a) "This order is subject to War Assets Administration Standard Conditions of Sale, and all other advertised terms and conditions, and no other terms or conditions shall be binding on War Assets Administration."

1353

PACK AWAY COSTLY LEAKS

. . . SEAL 'EM TIGHT WITH

QUAKER PACKINGS

With operating costs rising constantly, it's profitable to stop costly leaks and drips throughout your mine. And for tight sealing, economical service, it pays to pack pumps, valves, flanges, piston rods with Quaker quality packings . . . specially designed for each application.

These three packing leaders are but a few of the many types of Quaker packings for all uses and pressures. Remember, if it's packing for all purposes . . . conveyor, transmission or elevator belting . . . air, steam, or water hose, call your Quaker Distributor for quick, reliable service.

FOR PUMPS—Quaker offers a complete line of packings for centrifugal and reciprocating type pumps . . . for water and other liquids. Long-lasting, leakproof, economical.

FOR FLANGES—Quaker Ebonite Sheet Packing holds in high pressure, will not harden or melt, expands evenly. Ideal for superheated steam.

FOR VALVES—Quaker Valvolite, carefully twisted and lubricated, seals tightly. Stays pliable, won't score stems.

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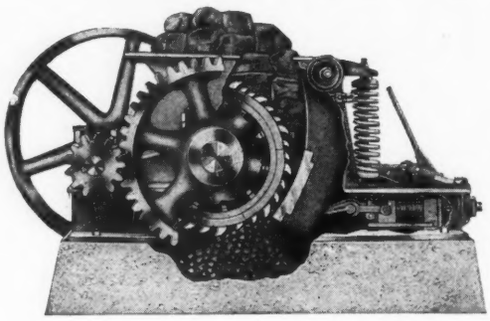
McLANAHAN BLACK DIAMOND CRUSHER

•With Automatic Steelstrut Toggle and Quick Adjustment

DEPENDABLE — ECONOMICAL



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Built for "peak" production under difficult working conditions—McLanahan Black Diamond Crushers are doing an outstanding performance job for hundreds of important coal producers. For present needs or future modernization of your workings—call on McLanahan. Built in all capacities for any sized product required. Descriptive data on request.

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Pit, Mine and Quarry Equipment Headquarters Since 1835

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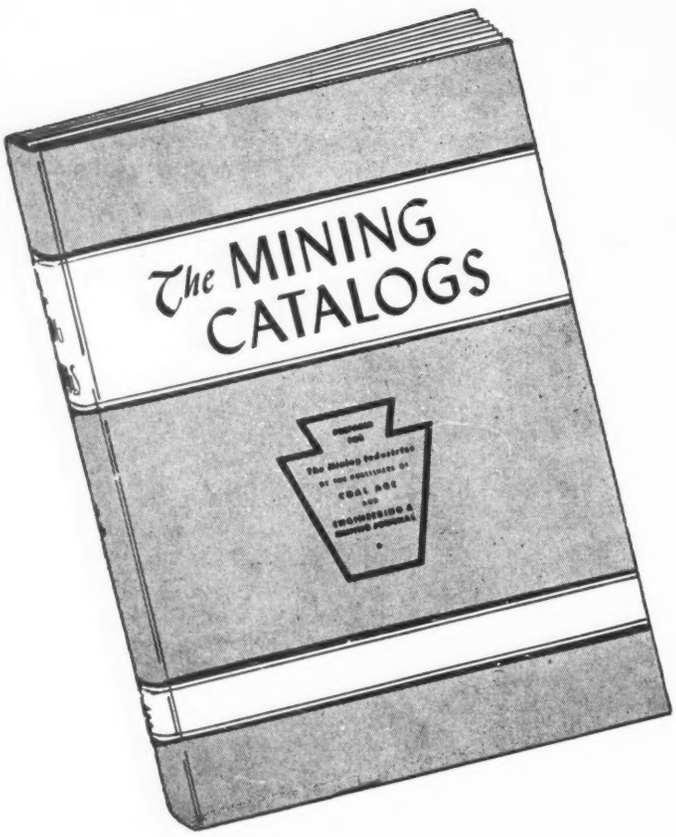

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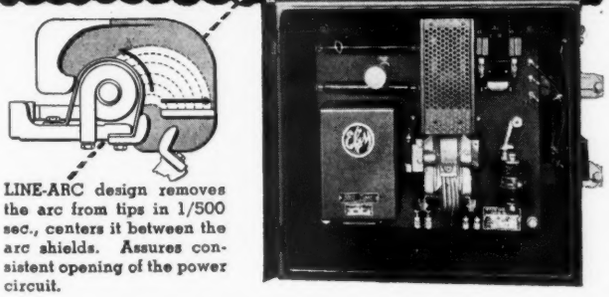
Ten years of field test has proven that our power-feed design of direct, transmission and worm gearing with two-speed control will not only cut shot hole drilling time in half but also eliminates costly maintenance delays. V-belt drive to the power-feed with an additional ample clutch in that assembly gives absolute control of a drilling speed of two to three feet per minute with a retrieving speed of twenty-four feet per minute.

The Parmanco Horizontal is adapted to all forms of high-wall drilling, will handle a six-inch auger up to a distance of sixty feet or more and, by use of our patented augers with interrupted flights and secondary cutters, will drill an absolutely clean hole with a minimum of torque. It permits the drilling of a controlled-angle hole which makes possible a great saving of explosives through the cantilever effect of this controlled-angle drilled hole.

EFFICIENT STRIPPING STARTS WITH EFFICIENT DRILLING

PARIS MANUFACTURING COMPANY
PARIS, ILLINOIS

HOW TO LIMIT Shutdowns



LINE-ARC design removes the arc from tips in 1/500 sec., centers it between the arc shields. Assures consistent opening of the power circuit.

USE EC&M *LINE-ARC* SECTIONALIZERS

THESE are sturdy units using a heavy-duty magnetic contactor of LINE-ARC design to open and close the power circuit.

With the overcurrent relay adjusted to the requirements of a stub-end feeder or similar section of the power circuit, protection is *accurate* and *quick* against roof falls, overloads, or short circuits.

And when the line is clear (free from trouble), they automatically reclose after an electronic time-delay, adjustable from 2 to 22 seconds.

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THE ELECTRIC CONTROLLER & MFG. CO.
2698 East 79th Street Cleveland 4, Ohio

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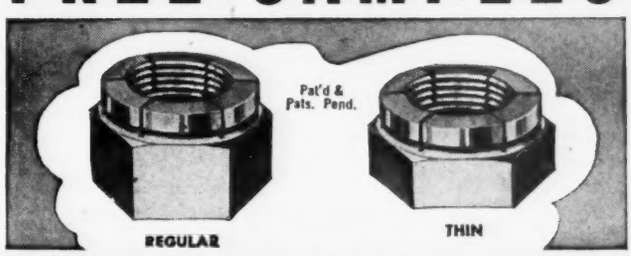

FLEXLOC

SELF-LOCKING NUTS

"Flexloc" is of one-piece all-metal construction, available in U.S.S. and S.A.E. thread series. Every thread of the "Flexloc"—including the locking threads—takes its share of the load, and the torque is unusually uniform because it is controlled. "Flexloc" accommodates itself to a wide range of tolerances . . . can be used over and over again, without losing much of its locking torque . . . is not affected by temperatures likely to be met within the field of Mechanical Engineering . . . being a "stop" nut, it *stays locked* in any position on the threaded member.

It is made by the manufacturers of the unexcelled "Unbrako" Socket Screw Products—guaranteeing quality. Sizes from #6 to 1" in diameter—in both "regular" and "thin" types (shown above).

MILLIONS OF "FLEXLOCS" NOW IN USE

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The greatest help a coal mining man can have—

IF YOU want to make sure of getting your certificate of competency—sure of winning a bigger job with bigger pay, get Beard's great books today and put them to work for you.

In these three books you have a practical, always-on-the-job guide that will help you solve the problems you face every day, show you what to do, tell you why it should be done.

Beard's

Mine Examination Questions and Answers

3 volumes — $8.25, payable in three easy installments.

THESE books explain what a man must know in order to become a mine inspector, a mine foreman, assistant foreman, fireboss, hoisting engineer, safety engineer, shotfirer, etc.

They give you complete and authoritative information about air and gases, explosives, safety requirements and methods, mechanics, engines, hoisting, drainage, pumping, ventilation, timbering, instruments, and every other detail that the practical mining man must know.

Can you answer these questions—

What is meant by splitting the air current and what are the advantages derived from such methods?

Can a miner live in air in which the oxygen content is reduced to 17 per cent?

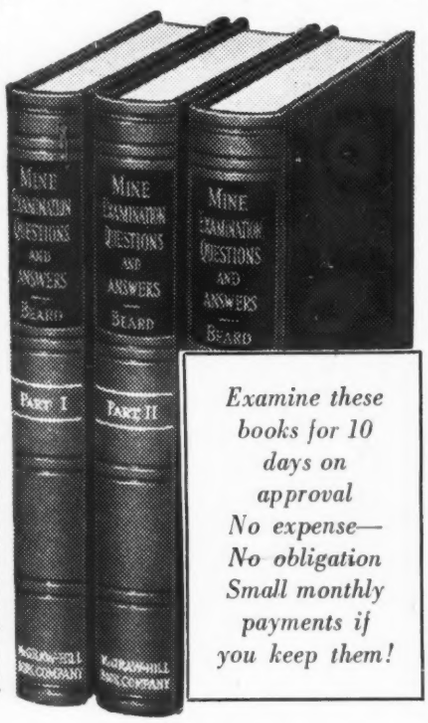
Name five duties imposed on mine foremen by law?

In what time can an engine of 40 effective hp. pump 4,000 cu. ft. of water from a shaft 360 feet deep?

What are the advantages and disadvantages of a gasoline pump, an air pump and an electrical pump?

What is the estimated tonnage per acre, per foot of thickness, for bituminous coal?

These are **but a few of** the more than 2,000 questions given in Beard's books together with full, correct answers. Hundreds of men have used this method to prepare for higher, better jobs. You can, too, if you have the Beard books and plan to use them systematically. They are the best investment that a mining man can make—not only as an aid for passing examinations but as practical reference volumes on everyday mining operation problems.



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Eliminates Ordinary Safety Switch Troubles

May be used as protective disconnecting switch for any motor in its range or for feeder protection at night when trolley line switch is opened.

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VIBRATORY FEEDERS

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— by their ability to handle bulk materials, from light, fine powders to heavy, coarse ores — hot or cold — dry or damp.
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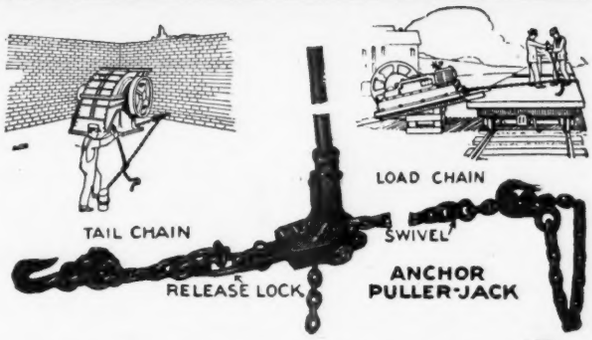
One Man Moves 5 Tons with the ANCHOR Puller-Jack!



Here's a one-man gang that quickly repays its price in labor, time and money saved. Has 3 tons direct pulling power, or 5 tons with sheave block. Pulls 15 feet without changing hold. Can be operated upright, sideways or upside down, with lever pull away from load or toward it. Simple, strong, foolproof. Practically nothing to get out of order. Positive action, always holds. Compact, quick and easy to set up and use. Hundreds of uses for this powerful tool wherever heavy objects must be moved. Order an ANCHOR Puller-Jack today, or write for descriptive catalog.

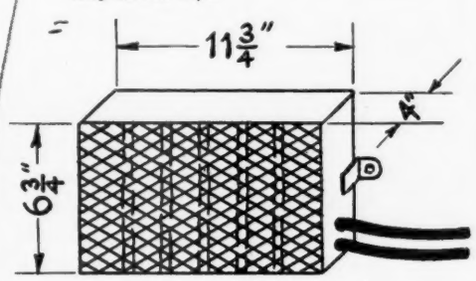
Easily carried and operated by one man.

$57.50 F. O. B. Bowerston, Ohio. Jack complete with 3 ft. steel tube handle, 15 ft. load chain with slip hook, and release lock. Longer chains available.

THE NOLAN COMPANY, Dept. CA
Bowerston, Ohio *Formerly The Mining Safety Device Co.*

G M C HEATERS

Below, in perspective drawing, the G.M.C. Locomotive Cab Heater—a 1500 watt heater when used on 250 volt circuit. Compact in design and a definite aid to operators of long outside trips.



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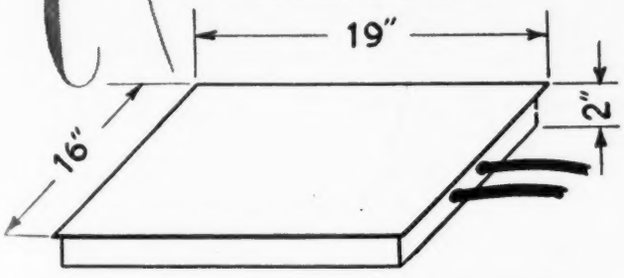

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Stuck!

NoSPIN

would have kept you rolling!

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Well, Mister—here's the answer to that spinning wheel! It's "NoSPIN"! With a NoSPIN installed in your truck or bus axle, *both* rear wheels *must* rotate when power is applied. Let's see how NoSPIN can save you trouble and money, give you greater safety and more reliability.

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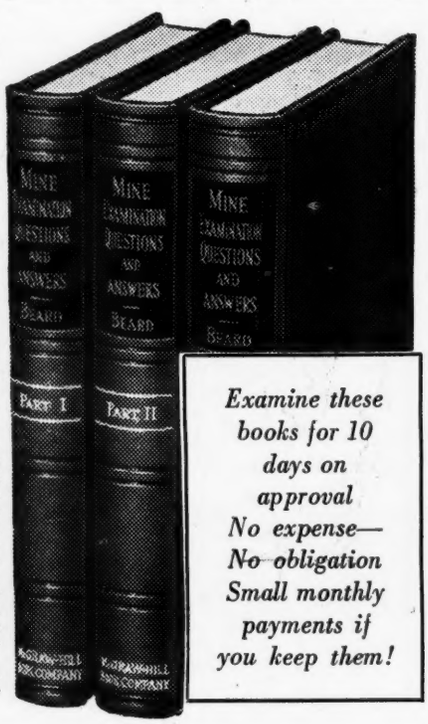

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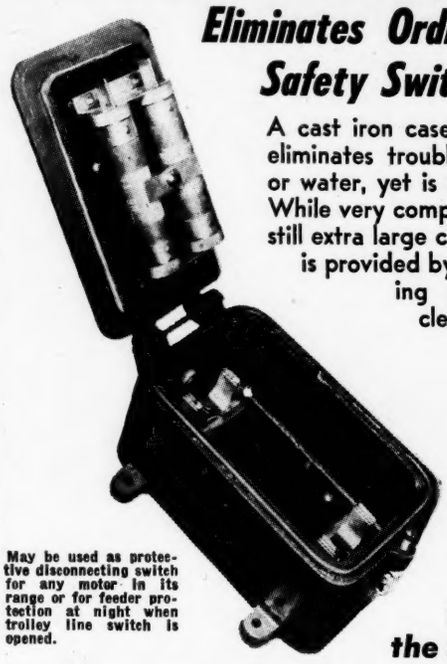

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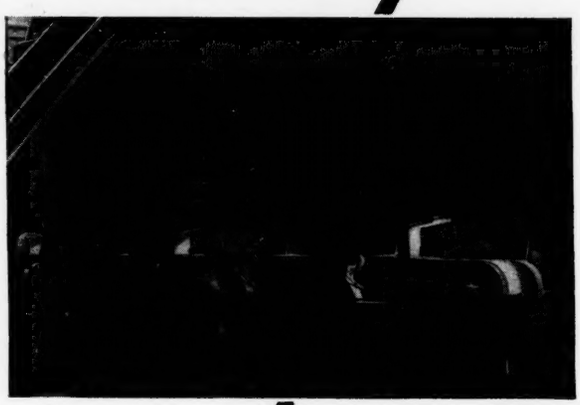

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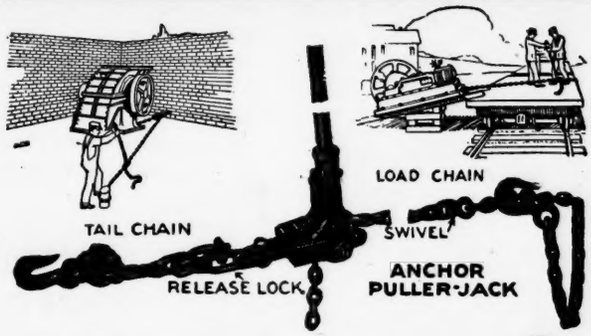

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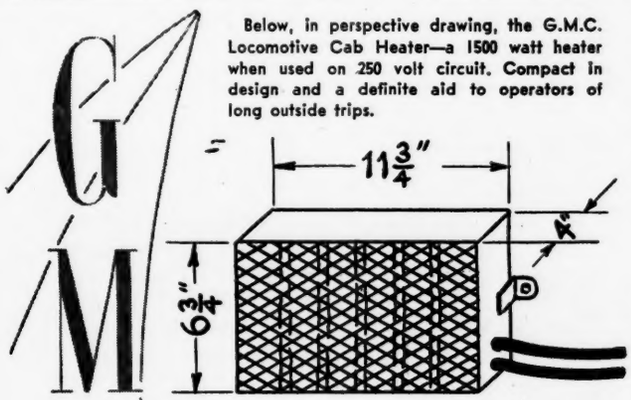

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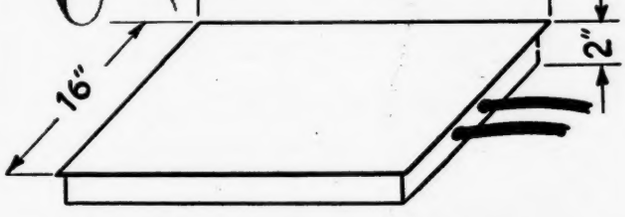

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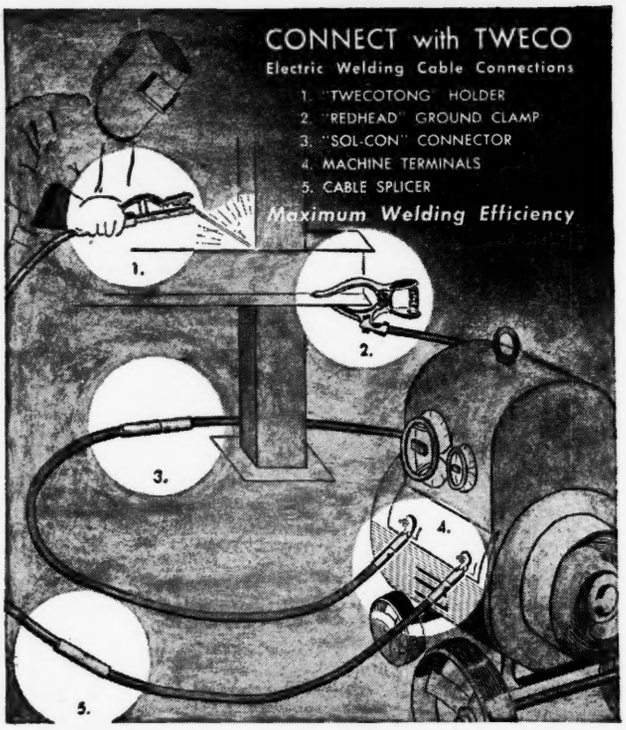

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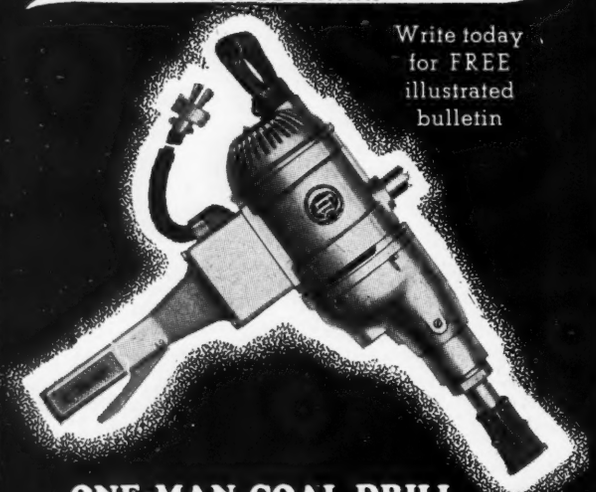

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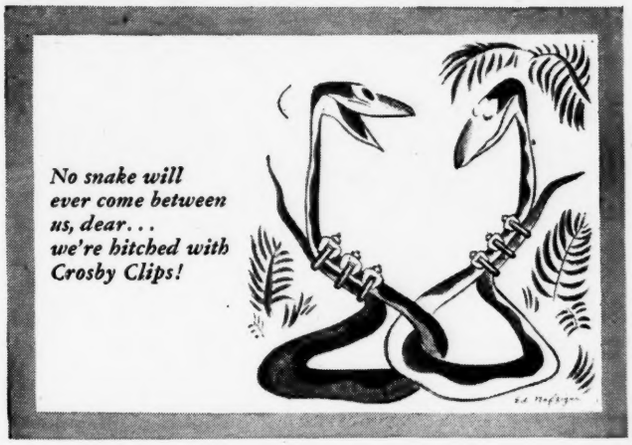

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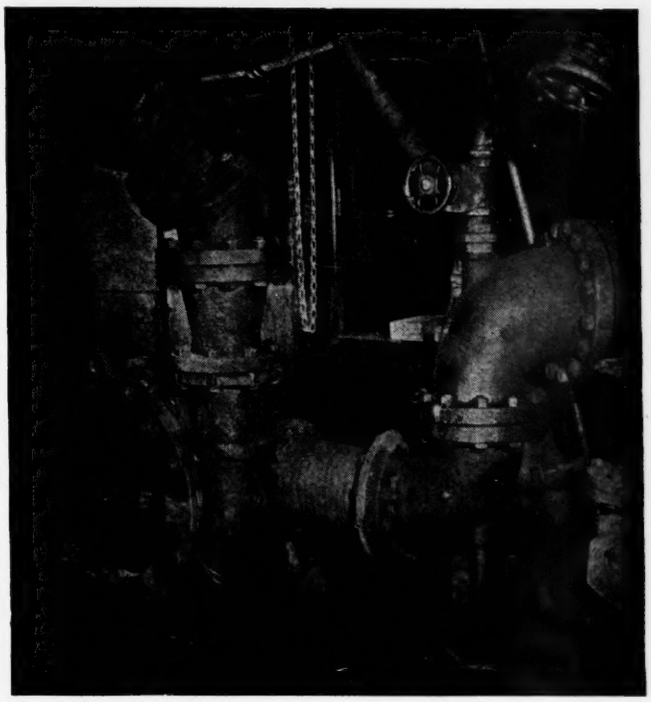

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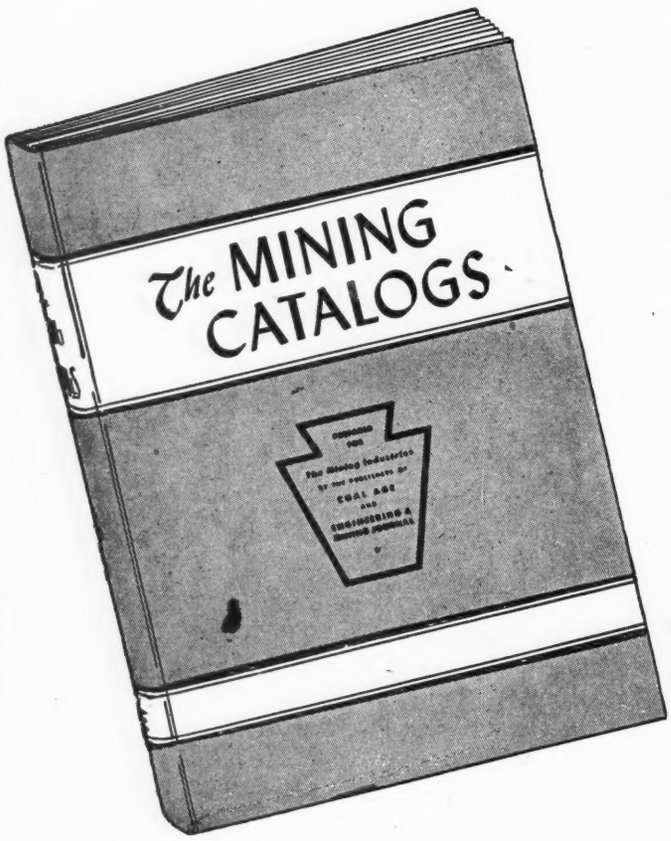

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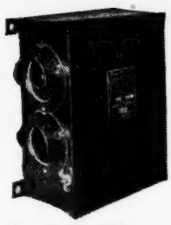

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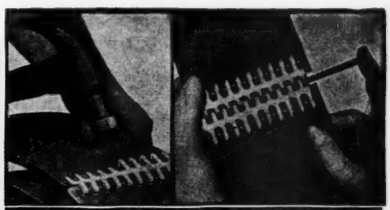
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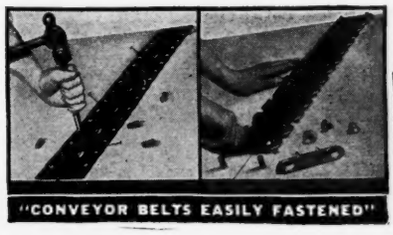
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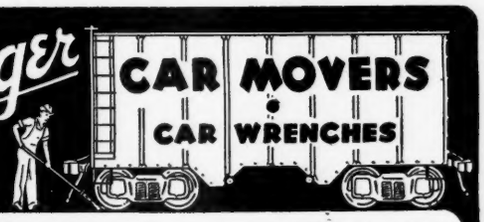
THE *Badger* LINE



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NEW ADVERTISEMENTS received by 10 A.M. October 28th will appear in the November issue subject to limitations of space available.

WANTED

Briquetting Specialist

Well-known Eastern manufacturer of heavy industrial machinery has opening for Sales Engineer to head Briquetting Machinery Division. Must be tops in this field, with record of successful achievement in both engineering and sales. Replies will be held confidential and applicants are invited to give complete information in first letter.

P-1968, Coal Age,
330 West 42nd St., New York 18, N. Y.

COAL BUYER WANTED

To purchase coal for City of Detroit. Should know how to buy, store and burn fuel and be familiar with sources of supply. College training necessary with combustion experience advantageous. Minimum Age: 27. Salary Range $5133 to $5850 per year. Applications received by Mail. For further information apply to DETROIT CIVIL SERVICE COMMISSION.
735 Randolph Street Detroit 26, Michigan

POSITIONS WANTED

Superintendent, Master Mechanic, or Electrical and mechanical engineer. Have good practical experience. Must be reputable coal company. PW 2321, Coal Age, 330 W. 42nd St., New York 18, N. Y.

Accountant, 8 years' experience in all phases of coal accounting, desires position with reliable and progressive coal company. Was assistant to manager of large strip mine. Will assume full responsibility of department. Applicant is also author of system for strip mine accounting. Write PW 1963, Coal Age, 520 N. Michigan Ave., Chicago 11, Ill.

CONTRACT WORK

Haulage Contractors
on large coal job. Good roads, long haul, together with long term contract. Must have large equipment. Southern field. CW-1532, Coal Age, 520 N. Michigan Ave., Chicago 11, Ill.

Wanted Contractor
to strip and load 150,000 to 200,000 tons #9 coal located Central West Kentucky. For details write or call Morgan Mines, Inc., 19 West 38th St., Indianapolis 8, Indiana. Phone LD-22.

WANTED

ANYTHING within reason that is wanted in the field served by Coal Age can be quickly located through bringing it to the attention of thousands of men whose interest is assured because this is the business paper they read.

COAL LANDS

Suitable for strip mining. Complete details upon request.

G. B. LORRAINE
Law Building, Richmond 19, Va.

WANTED
Coal Stripping Excavators

For long time job in high priced field, high quality coal, gentle rolling cover. Mostly shale and dirt in Southern field. Job calls for stripping and loading into our trucks.

P. 1530, Coal Age,
520 N. Michigan Ave., Chicago 11, Ill.

Have you idle Electrical Equipment?

Turn it into

CASH!

We Purchase:

Traveling Cranes
A. C. and D. C. Motors
Rotary Convertors
Motor Generator Sets
Transformers
Starting Equipment

Your listing will receive our prompt attention.

MOTOR POWER COMPANY OF NEW YORK, INC.
859 Madison Avenue **New York 21, N. Y.**
RHinelander 4-6478

WANTED

¾ to 5 yard Shovels
2 to 10 yard Draglines
Tractors and Dozers

Frank Swabb Equipment Co., Inc.
Hazleton National Bank Building
Hazleton, Pa.
Telephones 4911 and 4910J

WANTED TO BUY
MINE CARS, WOOD OR STEEL
3½ to 5 Ton, 42" Gauge, lift end.
Write
KONYA COAL CO.
Rivesville, W. Va.

WANTED
MINE HOISTS
Size 206 Ottumwa Iron Works Company Mine Hoists—Drums 30" Diameter x 22" or 24" Face.
BOOTHTON COAL MINING COMPANY
Boothton, Alabama

—TRANSFORMERS—

TRANSFORMERS WANTED

in operating condition or burnt out. Mail us list giving complete nameplate data and stating condition.

We Rewind, Repair and Redesign All Makes and Sizes
ALL TRANSFORMERS GUARANTEED FOR ONE YEAR

THE ELECTRIC SERVICE CO., INC.
"AMERICA'S USED TRANSFORMER CLEARING HOUSE"
Station M **Since 1912** **CINCINNATI 27, OHIO**

FOR SALE
USED COAL MINING EQUIPMENT & SUPPLIES

COAL CRUSHERS
2—30" Single Roll Jeffreys.
1—36" St. Louis, Ring Type.
1—10x24 Jeffrey Sling-Hammer Mill.

COAL WASHERS
2—Rheolaveur Launders, 60-80 Ton Capacity, complete with Header, Feed Pipes, Supporting Frame, Dividing Head, Sampler, 10'x12' Steel Bin, etc.

COAL CUTTERS
10—Sullivan CE7 AC Short Wall Coal Cutters, with Tyrex Cable, etc.
1—7-BU Joy Loader, 250 Volts DC, thoroughly overhauled.

TROLLEY LOCOMOTIVES
5—4½ Ton Goodman, 36" Gauge, equipped with Power Reels and Crabs.
2—7½ Ton Goodman, 36" Gauge, Single End Control.

BELT CONVEYORS
1—36" Belt Conveyor, 50' Centers.
1—30" Belt Conveyor, 370' Centers, Motorized.
1—28" Belt Conveyor, 70' Centers, Motorized.
1—24" Belt Conveyor, 15' Centers, with Ding's Pulley.
1—24" Belt Conveyor, 75' Centers, with Ding's Pulley.
1—24" Belt Conveyor, 85' Centers, Motorized.

MACHINE SHOP EQUIPMENT
1—24"x10' American Quick Change Lathe.
3—Drill Presses, 16" to 28".
1—Pipe Threader up to 2", B.D.
1—Smith Electric Welder, 200 Amps.
1—Gould & Eberhardt Shaper, 18" Stroke, B.D.
1—Cleveland Combination Punch & Shear, B.D.
1—Power Hack Saw, B.D.
Air Hammers, Hand Shears, Swing Cranes with 1½ to 2 Ton Y & T Spur Geared Blocks.

PIT CARS
160—Card 1.7 Ton Capacity, R.B. Pit Cars, 36" Ga.
30—1.7 Ton Capacity Pit Cars with Whitney Wonder Bearing Wheels.
1—Card Rocker Dump Car, 90 Cu. Ft. Cap., 36" Ga.

OFFICE EQUIPMENT
2—Monroe Electric Calculators, Late Type.
1—Dalton Adding Machine with Stand.
4—L. C. Smith & Remington Typewriters, Desks & Wooden Files.
1—C. I. Office Safe.

MINE LAMPS
188—Edison Model P Mine Lamps, complete with Racks & Charger.

MINE TRANSITS
1—Ainsworth Outside Mine Transit, complete.

I-BEAMS
40 Tons—12" & 18" I-Beams, approx. 32' Lengths.

COKE EXTRACTORS
2—Coke Extractors, complete, 250 Volts DC, Std. R. R. Gauge, with new Spare Parts.

LARRY CARS
4—Connellsville Larry Cars, 250 Volts DC.

RAILROAD SCALES
3—100 Ton Fairbanks R. R. Scale, Steel I-Beam Stringers.

TROLLEY & INSULATED COPPER WIRING
Several Miles of 2/0, 4/0 & 400,000 cm. R.C. Stranded Copper Wire.
2/0 & 4/0 Rd. & Fig. 8 Trolley Wire.
Trolley Hangers, Frogs, etc.
Approx. 700' 4/0, 3-Cond. Armored Cable good up to 600 Volts (In two pieces).

MINE FANS
1—8-H60 Aerodyne Mine Exhausting Fan, with Air Locks, Hood, Man Cage, Hoist, Head Frame, etc. Pur. New 1942.

RAIL
110 Tons—60#.
75 Tons—65#.
30, 40 and 60# switches.

HOISTS — ELECTRIC
1—No. 22 Vulcan Hoist, complete with 40 H.P. Motor, Controller & Grids.
1—No. 22 Vulcan Hoist. complete with Man Cage, 30' Headframe & 40 HP. Motor.

MISCELLANEOUS
Motors, AC & DC, 2 H.P. to 50 H.P.
Wall Phones, Jacks, New Supplies, etc.
Drag Chain Conveyors, with Dewatering Screens.
Flight Conveyors, 12", 24" and 30"—40 to 150 centers.

COMPLETE INVENTORY OF AMERICAN SMELTING & REFINING COMPANY'S HOLDINGS AT COKEDALE & BONCARBO, COLORADO, RECENTLY ACQUIRED BY US NOW AVAILABLE. GET IN TOUCH WITH US ON YOUR REQUIREMENTS.

FLORENCE
MACHINERY AND SUPPLY COMPANY

SUITE 904, EQUITABLE BUILDING **DENVER 2, COLORADO**

C. J. Parrish, Mgr.
Phone: Alpine 2803
Yards: Denver and Florence, Colo.

FOR SALE

LOCOMOTIVES—250 VOLT DC
2—13-ton Westinghouse, type 908-C
4—10-ton Jeffrey, type MH-78
3—8-ton Westinghouse, type 906-B
6—8-ton General Electric, type HM-939
5—8-ton Goodman, type 32-I-4-T-2
6—6-ton General Electric, type HM-801
The 6 and 8-ton Locomotives are equipped with CY-21 motor driven gathering reels and cable, track gauge 36" to 44".

CUTTING MACHINES—250 VOLT DC
20—12-AA Goodman, 50 H.P.
12—112-AA Goodman Universal, 50 H.P.
5—112-CA Goodman Universal, 50 H.P.
8—7-B Sullivan, 50 H.P.
10—24-L Jeffrey, permissible type Longwall Machines
12—Joy T1 Caterpillar type trucks
3—Jeffrey late type 29-L Arcwall Machines
The above machines are equipped with tip-turn trucks, cable reel and cable.

LOADING MACHINES—250 VOLT DC
5—L-400 Jeffrey
2—260 Goodman
8—7-BU Joy
2—11-BU Joy
3—Myers-Whaley

LOADING AND CUTTING MACHINES—220/440 VOLT AC
8—7-BU Joy. Just taken out of service
8—112-G3 Goodman Universal, tip-turn trucks, cable reel and cable

ELECTRIC HOISTS
1—Nordberg Shaft Hoist with 1600 H.P. General Electric Motor and all necessary appurtenances
1—1300 H.P. Nordberg Shaft Hoist with all necessary appurtenances
Several other hoists from 200 to 1000 H.P., suitable for shaft, slope or drift mine.

STEEL TIPPLES & MISCELLANEOUS
We have several 3, 4 and 5-track steel tipples, complete with shaker screens, vibrating screens and all necessary appurtenances, suitable for shaft, slope, drift or strip mines.
1—Jeffrey 10' Aerovane single stage blowing fan
1—Belt Conveyor, 7-ply, 32 oz., 42" Goodyear belt, steel carrying frame, Timken bearing carrying and return idlers, complete with 75 H.P. motor, 450' centers.

Frank J. Wolfe

We specialize in buying complete mines that are going out of business or from receivers in bankruptcy, administrators of estates, etc.

COAL MINE EQUIPMENT SALES CO.

306-7 BEASLEY BUILDING L.D. PHONE-34 TERRE HAUTE, INDIANA

SYNCHRONOUS ROTARY CONVERTERS

Qu.	KW	Make	Speed	D.C.V.
1	750	G.E.	1200	600
1	500	Whse.	1200	600
1	400	G.E.	1200	275
1	300	Whse.	1200	275
1	300	Whse.	1200	600
1	200	G.E.	1200	600
1	175	Whse.	1200	275
1	125	G.E.	1200	275

MOTOR GENERATOR SETS
3—150 KW, 900 RPM, 250 V. DC to 225 HP, 2300 V. AC Syn.
2—150 KW, 900 RPM, 600 V. DC to 225 HP 2300 V. AC, Syn.

MOTORS
1—80 HP. 1200 RPM, Cr. Wh. 220/440/3/60 Ind.
1—75 HP. 1800 RPM. U. S. Line Start 220/440/3/60 Ind. B.B.
1—65 HP. 1200 RPM, G. E. type KT. 220/440/3/60 Ind.
1—40 HP. 900 RPM, Whse. type CW, 440/3/60 Slip Ring.
5—5 HP. 2200 RPM. Reliance Ex. Proof, 230 V. D.C.
Several Whse. type SK, 230 V. D.C.
5, 7½, 10 and 15 HP. New TEFC and standard open ball bearing AC motors available. Across line and reduced voltage starters.

Electrical Equipment

Converters, Motor Generator Sets, A. C. & D. C. Motors, Control Equipment and Transformers.
We build equipment to fit your requirements. Over 25 years engineering background.

C. B. LOCKE CO.
P. O. BOX 3227
TEL. 38-136
CHARLESTON, W. VA.

NEW and REBUILT

TRANSFORMERS
3—37½ KVA pitts. Cont. Duty Auto. 6900-2300/1/60.

HIGH GRADE TOOLS

2½" Bar Cleveland Horiz. Boring Mill.
3" Bar G & L Horizontal Boring Mill.
21" Cincinnati Bickford Up. Drill.
17"x8' LeBlond Grd. Head Lathe.
18"x18' Sidney Monotrol Lathe.
24"x12' Boye & Emmes Lathe.
30"x18' LeBlond Q.C. Lathe.
#3B Milwaukee Plain Miller.
#3 Cincinnati Universal Miller.
#3 Cleveland Universal Miller.
3' and 3½' Cincinnati Radial Drills.
16" and 24" G & E Shapers.
16" Cincinnati B.G. Shaper.
28" G & E Shaper.
24"x24"x6' Ohio Planer.
36"x36"x14' American Planer, 4 heads.
Have various other machines in stock.
Send us your inquiries

Cincinnati Machinery Company, Inc.
217 E. Second Street, Cincinnati 2, Ohio

FOR BUYING OR SELLING USED MINING EQUIPMENT CONTACT US FIRST!

MINE EQUIPMENT EXCHANGE
BOX 170 BLUEFIELD, W. VA.

STRIPPING & MINING EQUIPMENT

Coal Crushers
Conveyors
Vibrating Screens
Electric Generator Sets
Electric Coal Drills
Mine Fans

THE INDUSTRIAL EQUIPMENT CORP.
(Established 1902)
910 First National Bank Bldg.,
Pittsburgh 22, Pa.
Warehouse: Carnegie, Pa.

AIR COMPRESSORS:
12—Belted 360, 676, 870, 1000, 13000 ft.
12—Diesel 105, 315, 520, 676 & 1000 ft.
6—Electric 1300, 1500, 2200, 5000 ft.

CARS & LOCOMOTIVES:
100—50 ton cap. Gondolas.
35—50 ton cap. Flat Cars.
4—35 & 65 ton Diesel Locomotives.
6—10, 16, 20 & 30 ton Gas Locomotives.
150—8000 & 10000 gal. cap. Tank Cars.
30—12 & 20 yd. St. Ga. Dump Cars.
1—50 ton G.E. Diesel Elec. Locomotive.

RUBBER CONVEYOR BELTS:
1000', 60", 600' 30", 300', 20", 1000', 42", 900' 48", 1450', 36", 1200', 24", 900', 18", 600', 16", 350', 14".

ELECTRIC LOCOMOTIVES:
15—3, 5, 8 ton Battery & Trolley.

DIESEL GENERATORS:
12—100, 150, 180 & 480 K.W.

MINE LOADERS:
17—GD9, Elmco 21, Conway 20, 50, 60 & 75 and Sullivan HL3.

STEEL TANKS
6—50,000 and 100,000 gal. Tanks on tower.
30—8000, 10,000 and 20,000 gallon capacity.

SHOVELS — DRAGLINES:
7—1 yd., 1½ and 2 yd. Gas & Diesels.
16 yd. Elec. 16 ft. Boom Dragline.

R. C. STANHOPE, INC.
60 E. 42nd Street New York 17, N. Y.

FOR SALE
Roll Crusher
30" x 36" Robins double roll crusher. Mine run to 1" or 1½" product. 30 H.P. G.E. totally enclosed fan cooled motor, 3-60-220/440.

THE DARIEN CORPORATION
49 E. 41st St. New York 17, N. Y.

NEW and REBUILT
STORAGE BATTERY

LOCOMOTIVES

1½ to 10 Ton 13" to 56" Track Gauge
GREENSBURG MACHINE CO.
Greensburg, Pa.

Bucyrus Monighan 5W Diesel Walker dragline.
Bucyrus-Erie 34B 1½-yd. Diesel shovel.
Walter 12-yd. Diesel rear dump trucks (5).
B-E 50B shovels, Diesel, electric, steam.
Marion draglines, 20-yd., 7-yd., elec.
Plymouth 20-ton gas locomotive, std. ga.
Plymouth 10-ton gas locomotive, 36" ga.
Steam locos., 17-18 ton. 36" ga., rebuilt.
B-E & Marion elec. shovels, 2¼, 2 1½-yd.
Shovel front attach., 2-1/3 yd., 52-55B.
H. Y. SMITH CO., 828 N. Br'dway, Milwaukee 2, Wis.

BY WISELY

advertising your used or surplus new equipment in the Searchlight Section you turn it into CASH.

"SEARCHLIGHT" is the recognized national center for the buying and selling of such equipment.

Information Cheerfully Given, Address: Classified Advertising Division

REBUILT EQUIPMENT—READY TO SHIP

MOTOR GENERATOR SETS—250 V. D.C. (Motors 220/440 or 2200 V., 3 Ph., 60 Cy.)

No.	KW.	Make	Speed
2	40	West.	850
5	50	West.	1200
2	75	Star	1200
2	75	G.E.	600
4	100	Star	1200

D.C. GENERATORS—250 Volts—D.C.

No.	KW.	Make	Speed
10	10	West.	1150
11	15	West.	1400
3	15	West.	1150
2	20	West.	1400
3	20	West.	1150
5	25	West.	1400
4	25	West.	1150
3	40	West.	850
5	50	Louis Allis	1150
4	75	Star	1150
5	100	Star	1200
3	125	Star	1150

ENGINE GENERATOR SETS

1—35 KVA 220/440 v., 3 ph., 60 cy., dir. con., Ridgway Steam Engine.
3—100 KW, G.E. 250 v., DC Gen. Motors Diesel.
1—125 KVA 240/480 v., 3 ph., 60 cy., West. dir. con., to Erie Ball Engine Electric Light Plants—gas, Gasoline and Diesel AC and DC—1 KW, 2 KW, 5 KW, 7½ KW, 10 KW, 25 KW, 60 KW and 100 KW.

AC GENERATORS—2200/4000/440/220 V.

1—110 KVA Allis Chal., 277 rpm.
1—450 KW. Elec. Mach., 120 rpm.
1—1250 KW. West. 80% P.F., 1200 rpm.

D.C. MOTORS — 230 Volts

No.	H.P.	Make	RPM	Type
1	175	G. E.	450	MD
5	150	Star	1800	F-92
5	125	Star	1150	
1	125	West.	1400	S-10
4	125	West.	1800	F-9
1	100	West.	700	S-12
4	100	Star	1800	
1	80	West.	450	
1	75	West.	575	SK-183
2	55	West.	650	SK-121
2	40	West.	625	MC-60
3	40	Cr. Wheel.	1700	CM
1	40	West.	625	MC
1	40	West.	775	SK-140
1	35	G. E.	700	DLC
1	30	G. E.	530	LC
1	30	West.	700	S
1	30	C. Wh.	1750	CMC
1	30	Allis-Chal.	950	
1	25	West.	600	SK-130
1	25	West.	600	SK-113
6	25	West.	825	SK-120
5	25	West.	1150	SK
1	25	West.	1750	SK-83
3	20	Reliance	850	131
6	20	West.	975	S
3	20	West.	900	SK100L
5	20	West.	1150	SK-93
3	20	West.	1750	SK-83
10 new	20	Delco	1800	ball-br.
2	20	G. E.	3600	CD
3	15	West.	560	S-7
2	15	West.	900	SK
12	15	West.	1150	SK-83
24	15	Delco	1800	
15	10	West.	850	SK-83
6	10	West.	1150	SK-63
4	10	West.	1750	SK-43

230 V. D.C. MAGNETIC STARTERS AND CONTROLLERS

456—New 1 HP. Cutler Hammer across the line.
111—New 1 HP. Cutler Hammer across the line.
30—New 2 HP. Cutler Hammer across the line.
55—New 5 HP. Cutler Hammer drip proof. 2 step current limit OL and LV.
58—New 7½ HP. Cutler Hammer.
60—10 HP. Cutler Hammer Magnetic.
12—10/15 HP., 230 V. Westinghouse Magnetic Drip Proof Controllers, 2 steps acceleration thermal overload relay with stop, start and reset buttons.
9—New 10/15 HP., 230 v. G.E.
10—New 20/35 HP., 230 v. Ward Leonard Magnetic.
10—New 40 HP., 230 v. G.E. Magnetic.

A.C. MOTORS—4000/2200/220/440 V.—3-Ph., 60 Cy.

No. HP.	Make	Rpm.	Type
1 500	Elec. Mach.	120	Syn.
1 750	West.	1200	Syn.
1 1000	West.	1200	Syn.

HOISTS

200 Room Hoist with ¼" cable with AC or DC Motors.
Car Pullers—75—Car Pullers with ¼" cable equipped with DC or AC motors, or can be operated by hand.
Winches—150 Winches—1½ Ton capacity with cable, hand operated or with DC or AC motors.

CONVEYORS

3—G-20 Goodman Shaker Conveyors each with a Goodman Duck Bill complete with motor equipment with 250 v. DC motors.

PUMPS—Equipped With AC or DC Motors

1—11 GPM 460 ft. head Worthington Oil Pump.
1—60 GPM 479 ft. head Gould Pump.
1—100 GPM 50 ft. head Dayton Dowd Pump.
1—130 GPM 50 ft. head Dayton Dowd Pump.
1—160 GPM 50 ft. head Dayton Dowd Pump.
1—195 GPM 200 ft. head National Transit Pump.
1—210 GPM 60 ft. head National Transit Pump.
1—220 GPM 231 ft. head 3½" x 3" Blackmer pump.
2—243 GPM 100 ft. head Dayton Dowd Pumps.
1—300 GPM 90 ft. head Dayton Dowd Pump.
2—300 GPM 20 ft. head Gardner-Denver Pumps.
3—378 GPM 44 ft. head Dayton Dowd.
1—450 GPM 104 ft. head Dayton Dowd Pump.
1—500 GPM Morris Machine Wks. 4" suc., 4" dis., 123 ft. head, 1760 rpm.
1—550 GPM 88 ft. head Dayton Dowd Pump.
3—750 GPM 70 ft. head Dayton Dowd Pumps.
1—4000 GPM 138 ft. head Ingersoll Rand Pump.

COMPRESSORS

2—315 CFM. Ingersoll Rand Portable, 100 lbs. pres., driven by 105 HP. Waukesha Oil Engines, 860 rpm.

STORAGE BATTERY LOCOMOTIVE

1—40-ton Goodman type M with Edison 63-G-18 battery with 2 motors, 11 hp., 80 v. with double reduction gear, speed 3½ MPH, 2,000 lbs. draw bar pull. Spare set of batteries and battery box, also spare parts.

VARIABLE SPEED MOTORS—230 V. DC —from 1 to 165 HP.
AC MOTORS—from ½ to 150 HP. squirrel cage and slip ring.

ROTARY CONVERTERS

2—75 Kw., 250 v. D.C. General Electric 2300/3/60 A.C.

PIPE CUTTING AND THREADING MACHINE

1—Cox & Son complete with dies ¼ x 3" complete with countershaft and A.C. or D.C. motor.

NEW DC MAGNETIC STARTERS—1 HP. to 25 HP.

DUQUESNE ELECTRIC & MFG. CO., PITTSBURGH [6], PA.

Montrose — 5800

PIPE—MACHINERY—GAS ENGINES
AIR COMPRESSORS—DIESELS—PUMPS

Some Steam Engines and Boilers available only slightly above the metal price

BRADFORD SUPPLY COMPANY

WAYNE, WOOD COUNTY, OHIO — Near Toledo

FOR SALE

36" gauge railroad equipment

6—10-Yard Western, All-Steel Manually Operated DUMP CAR With Lift Doors.

2—8-Ton, Westinghouse Electric LOCOMOTIVES, 600 Volt D.C. Trolley Operated.

PRICED TO MOVE:

IRON & STEEL PRODUCTS, INC.

42 years' experience

13480 S. Brainard Ave., Chicago 33, Illinois

"ANYTHING containing IRON or STEEL"

BATTERY LOCOMOTIVES

Permissible 44-GAUGE JEFFREY, can be changed to 42 gauge, excellent condition.

S. E. GANE & CO.
508 Grant Street Pittsburgh 19, Pa.

IRON and STEEL PIPE

New and Used

Large stocks, all sizes attractive prices

L. B. FOSTER COMPANY

P. O. Box 1647 Pittsburgh 30, Pa.

CONVEYOR & ELEVATOR BELTING

EVERYTHING NECESSARY FOR BELT CONVEYORS AND BELT ELEVATORS

IMMEDIATE DELIVERY REDUCED PRICES

FRANK A. KREMSER & SONS, INC.

3435 N. Fifth Street, Philadelphia 40, Pa.

Regent 9-7272 Regent 9-7524

SEARCHLIGHT SECTION

GUYAN MACHINERY COMPANY, Logan, W. Va.

MINING MACHINES

Jeffrey: 2—35B, 28A, 260 V. 1—24B Low Vein. 4—29B, 29C, 29CE with shearing head. Also 1 on cats. Revolving head for 29C. 2—Longwall 24B.

Goodman: 12A, 12AB, 12AA, 512, 12G3A, Shortwalls. 424, 24B, 124EJ Slabbers.
1—12G3, 220 volt and 2—2 DA, 500 volt.
2—Permissible Type 12CA, 6—112AA. Motors for 212 G3—Volts 220. Phase 3.
1—Hitch Cutter for Cross Head timbers.
1—512 Goodman Shortwall Machine, 215 v.
2—Goodman Slabbing Machines, permissible type, 250 and 500 volts.
3—Longwall Low Vein Type 11AA on self-propelling truck 250 V.

Sullivan: CE7, CE9, CE10, CR10 Low Vein.
1—Buddy Sullivan 220 Volt, 3 Phase.

SUBSTATIONS — 275 volts, D. C.

1—150 KW **G. E.** MG Set.
1—300 KW **Westing.** Rotary. As is armature needs rewinding.
1—150 KW **West.** MG Set.
1—100 KW **Ridgway** MG Set.
1—200 KW **W H** Rotary Converter.

LOCOMOTIVES

Goodman: All 250 volts.
1—6 ton, 30B, 43" 1—5 ton.
1—5 ton 8-30 36" gauge.

Westinghouse: All 250 volts.
906 motors and 102-904-115.
Bar steel frames 10 ton, 6 ton, and 4 ton.

G.E.: All 250 volt.
6 ton 803, 44" as is.
6 ton 823, 44". 6 ton 819-821.
6 ton 801. 5 ton 825, 44" & 36"
8 ton 839. 8 ton 839 motors.

LOCOMOTIVES

Jeffrey: 8 ton, 250 volts, type MH73. Locomotive motors and Crabs and Reels for Locomotives.

SPARE ARMATURES

Jeffrey: MH110, MH78, MH73 and MH64-350 V. and 500 V. 29B, 35B and 28, 35BB, 35A, 29C, 29L, 35L.

Goodman: 34B, 30B, 30C, 12A, 2600 K and R; 12AB, 12AA, 33-1-4-T, 31-1-4-T, 32-1-4-T.

General Electric: 801, 807, 819, 821, 825, 839.

Westinghouse: 904, 905, 906, 102, 907, YR2, 115. Also 200 KW.

200 KW Westinghouse Rotary Converter Armature: 250 V. Bracket Type, 150 KW G.E., HCC Bracket Type.

Sullivan: CE7, CE9 and CE10.

OTHER ITEMS AVAILABLE

Aerial Tramways.
Automat Loader: 1 Myers-Whaley #4.
Belt Conveyors: 1 Bucket Elevator Conveyor.
Bit Sharpeners, 2 Sullivan, 1 Diamond.
Blue Print Machine: 42" wide, continuous Mercury Arc Light.
2 Loading Booms: 40'x5' with Picking Table.
Bond Welders: Resistance.
Circuit Breakers: AC and DC.
Circuit Breakers, Automatic: 250 volt 600 amps.
Circuit Breakers, Manual: 600 amps to 3,000 amps.
Clam Shell Bucket: 1¾ cubic yard.
Coal Crushers: (double roll) 16"x16", (single roll) 24"x30" 24"x24", 36"x36", 30"x30", 18"x18", 12"x16".
Compressors & Jackhammers, Compensators.
Drop-Bar Supports: (Goesenck) 29B and 29C.

OTHER ITEMS AVAILABLE

Dumps: Crossover.
Field Frames.
Generators: DC 250-275 volt, 30 KW to 100 KW. 1—50 KW 3000 R.P.M., 250 Volt.
Hoists:
Hoists: overhead, AC 3-60-440 1 ton and 2 ton. Crabs and Room Hoists.
Lathe: 48"x14' with Taper Attachment and 3-60-220 Motor.
Lathes, Switches.
Loading Machines and Goodman Shaker Conveyors and Duckbills. Myers Whaley.
Milling Machines, horizontal and vertical.
Mine Cars: 48" gauge.
Mining Machine Trucks.
Motors: Miscellaneous and 1—5-HP Fynn Weichsel, 1800 RPM, 220 Volt Slipring or synchronous series. Crane type. 1—oilwell motor, 2 speed 575 and 1160 HP, 15' and 135', 440 volts. Slip Ring with control and pole charger.
Motor Starters and Controllers: AC and DC.
Plants: Diesel Power, 55 KVA Rotary Transformers, Voltage 23100/208. Synchronous Motor Starters, full Magnetic Across-the-line, 3 phase, 60 cycle, 150 Volts—2-200 H.P. and 6-250 H.P. Westinghouse.
Pumps: Rebuilt and New.
R. R. Switches: 85# to 100#.
Shaker Conveyors and duckbills.
Slate Larry: 2—5BU on Cats. 2—Myers-Whaley, #3 and #4.
Spare Motors: DC and AC for mining machines and locomotives.
Switchboards.
Speed Reducers.
Transformers.
Tripmakers: 2 car haul.
Welders: AC 220/440 volts, 350 and 400 amp.
1—Spot Welder, 50 KVA, 220 Volts.

ROTARY CONVERTERS

500 KW GE. SYN. 275 V., 6 Ph. 60 Cy., 1200 RPM. Pedestal Type. 2300 V. Transformer and Switchgear.

300 KW GE. SYN., 575 V., 6 Ph., 60 Cy., 1200 RPM. Pedestal Type. 2300/4000 V. Transformers and Switchgear.

MOTOR GENERATORS

500 KW GE. SYN., 575 V. 2300/4000 V., 3 Ph., 60 Cy., 900 RPM. Complete Manual Switchgear.

300 KW RIDGWAY SYN., 275 V., 2200 V., 3 Ph., 60 Cy., 1200 RPM. Complete Manual Switchgear.

200 KW GE. SYN. 275 V., 2300 V., 3 Ph., 60 Cy., 720 RPM. Complete Manual Switchgear.

300 KW A.C. IND. 275 V., 2300 V., 3 Ph., 60 Cy., 1200 RPM. Complete Manual Switchgear.

150 KW GE. SYN. 275 V., 2300 V. 3 Ph., 60 Cy., 1200 RPM. Complete Manual Switchgear.

LOCOMOTIVES

10-T JEFFREY, 250 V., MH-110 Mts., 36-48" Ga.
10-T WEST., 500 V., 907-C Mts., 36"-44" Ga.
10-T WEST., 250 V., 907-C Mts., 36"-44" Ga.
8-T WEST., 250 V., 906-C Mts., 42"-48" Ga.
6-T G.E., 250 V., HM-701 Mts., 22"-32" Ga.
6-T WEST., 250 V., 903-B Mts., 22"-30" Ga.
6-T JEFFREY, 250 V., MH-88 Mts., 36"-42" Ga.

Each unit listed above is owned by us and is available now for immediate purchase

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Incorporated

501 Grant Building, Pittsburgh, Pa.

COAL CUTTING MACHINES

1—35B Jeffrey Shortwall, 250 V., D.C.
1—35BB Jeffrey Shortwall, A.C.
2—29C Jeffrey Arcwall, 250 V., D.C.
1—124 E. J. Goodman Slabbing, 250 V., D.C.
1—36B Jeffrey Longwall, 250 V., D.C.
1—12G3 Goodman Shortwall, A.C.
2—112 C.A. Goodman, 250 V.

LOCOMOTIVES

1—5-ton Goodman with 2 type 41, 250 V. motors.
1—5½-ton Ironton Storage Battery Locomotive.
1—6-ton Jeffrey with MH 88, 250 V. motors.
2—15-ton G.E., 250 V.

M. G. SETS

1—60 KW, 250 V., D.C., with 100 HP Synchronous Motor.
1—75 KW, 250 V., D.C., with 112 HP Synchronous Motor.
1—150 KW Ridgeway, 275 V., D.C., 3/60/2200/1200.

ELECTRIC MOTORS

1—400 HP Allis-Chalmers SC 3/60/2200/1150.
1—250 HP G.E. Slipring, 3/60/2200/600 RPM.
1—200 HP Westinghouse, type CW, slipring, 3/60/2200/514 RPM.
1—185 HP Burke SC 3/60/2200/1150.
1—150 HP G.E. Squirrel Cage 3/60/900.
1—125 HP G.E. Squirrel Cage 3/60/900.
1—100 HP Synchronous Motor 3/60/440/1200 RPM.
1—100 HP G.E. Squirrel Cage 3/60/900 RPM.
1—40 HP Westinghouse Squirrel Cage 3/60/1800.
1—25 HP G.E. Squirrel Cage 3/60/720.
2—15 HP Westinghouse Squirrel Cage 3/60/900.
1—7½ HP G.E. Squirrel Cage 3/60/1800.
1—5 HP Westinghouse Squirrel Cage 3/60/1800.

TRANSFORMERS

3—333 KVA Westinghouse, 22000 V. to 230 V.
1—50 KVA Westinghouse 1/60/2300/220/440 V.
2—15 KVA 1/60/2300/220/440.

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1—36" x 36" Jeffrey S. R. Coal Crusher, gear drive.

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The above described equipment has been inspected by our engineers. The bins, structure, and machinery are in first class condition. Designed and built by Link-Belt.

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2—Engine driven generators, 2300 v. 325 KVA Allis-Chalmers and 460 KW G.E. Details on request.

1—300 KW Ridgeway M.G. set 250/275 DC 3/60/2300 syn. with controls.

1—750 KW, 250 volt D.C. Generator, direct connected, single bearing.

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3—Goodman G 20 Shaker Conveyors with 250 v. 20 HP motors, also Goodman ±3 Duck Bills.

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3—35B Jeff. Perm. 250 v. 6′ Jeffrey Chain & Bar on revolving trucks.
4—35B Jeff. Perm. 500 v. 7½′ Cln. Chain and Bar on revolving trucks.
2—12G3 Goodman AC 220/3/60 6′ Bars.

STORAGE BATTERY LOCOMOTIVES
1—6 Ton G.E. permissible 36/44 Ga. HM 825 BB.
4 Ton 36″ Ga. Atlas 2 BB Motors.
5½ Ton Type D Ironton, 42″ Ga.
2—5½ Ton Ironton Type A, 36/42″ Ga.

Haulage & Gathering Locomotives
13 Ton Westgh. 250 v. 36″ or 40″ Ga.
3—6-ton G.E. 250 v. HM 803 BB Motors, 36″ Ga. O.S. Rolled Steel frame with flat top motor driven reel.
4—6 Ton Jeff. O.S. wheels, 42″ Ga. MH, 88 Motors, 250 v. with gath. crabs.
10 Ton Goodman 36B04T O.S. fr. 250 v. 36″ Ga. Under Rotary Con. & MG Sets (3 ph. 60 cy.)
750 KW G.E.-550 v. 1100 HP Syn. 4600 v.
640 KW Al. Ch. 250 v.—860 HP Syn. 2300 v. (available 2 months.)
2—300 KW G.E. 275 v.—435 HP Syn. 440 v. (available 6 months.)
150 KW G.E. 275 v.—225 HP Syn. 2300/4000 v.
100 KW Ridg. 275 v.—150 HP 2300 v. Syn.

COAL CRUSHERS
18x24 and 18x30 New Scottdale dbl. roll.

Rotary Con. & MG Sets (3 ph. 60 cy.)
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50 KW G.E. 125 v. 75 HP G.E. 2200 v. 440/220 v.
35 KW Cr. Wh. 250 v.—50 HP 220/440 v.
7½ KW Wooton 125 v. 10 HP. Wooton Vert.
3—New 10 KW 125 v.—220/440/3/60.

DC MAGNETIC STARTERS
New 230 v. DC Magnetic Cutler Hammer. Starters, 25, 40, 50, 60, 75 & 100 HP.

SLIP RING & SQ. CG. MOTORS

HP	Make	Speed	WDG	Type
1400	West.	1200	Syn.	New 1 P.F.
1000	West.	1200	Syn.	New 8 P.F.
750	West.	1200	Syn.	New 7 P.F.
600	West.	900	S.R.	CW NEW
350	G. E.	900	S.R.	I-M
300	West.	1800	S.R.	CW
250	West.	277	S.R.	CW 1314
200	G. E.	240	S.R.	MT 412
150	West.	720	S.R.	CW
100	West.	1750	S.R.	C-I
100	G. E.	500	S.R.	M 1-25-cy.
75	G. E.	805	S.C.	I K
60	G. E.	1160	S.C.	KT343
50	West.	560	S.R.	CW 658 D
50	G. E.	500	S.R.	I-M
50	West	870	S.C.	CS 638A

HOISTS, CRANES & PUMPS
400/500 HP Flory slope Fixed drum 6′ dia., 5′ face. 9″ flanges—22000± rope pull.
400 HP Vulcan conical drum shaft Hoist.
1—50/75 HP 2 drum Meade Morrison slope.
75 HP Ottumwa slope with AC Motor.
75 HP Vulcan 2 drum shaft, S.R. Motor.
40 HP Lidgerwood sgl. ft. drum geared to A.C.
1—1 Ton AC Monorail 220/3/60.
2—Fairmont Car Retarders.
10 Ton Larry Car 500//250 v. DC.
10 HP Fridy Car Puller, AC Motor.
15 HP Ottumwa sgl. fr. dr.—15 HP. SK 230 v.
4—2720 GPM 85′ Le Courtney Bronze fitted 10″.
1—700 GPM 60′ Wheeler Bronze Fitted 5″ Cent.
625 GPM 12′ Hd. DeLaval 10 HP 230 v. DC.
300 GPM 44′ Hd. DeLaval 10 HP. 230 v. DC.
300 GPM 35′ Hd. DeLaval 1½ HP 230 v. DC.
150 GPM 53′ Hd. DeLaval 5 HP, 230 v. DC.

DC MOTORS GENERATORS, 230/250 v.

HP	Make	Speed	Wdg.	Type
1200KW	Al. Ch.	750	cpd.	500 v.
1500	West.	600	sh.	600 v.
175	G. E.	475	ser.	MD 109
130	G. E.	550	ser.	CO 1812
100	G. E.	480	ser.	MD 108
50	Northern	600	ser.	K
50	West.	250/1000	sh.	SK
50	Reliance	1750	cp.	166 T
40	G. E. (Vert)	1750	cp.	CD 93
40	Roth	1500		
35	Cr. Wh.	700	sh.	CM
15	West.	800	cp.	SK 93
15	Wh.	800	sh.	CM
15 (4)	C. Wh.	1400/1700	sh.	CM
13	West. (Enc.)	825	cp	SK 113
10 (2)	G. E.	1750	sh.	CD
7½	G. E.	1750	sh.	RL

AIR COMPRESSORS
1200 cu. ft. 100± Worthington 2 stage Belted.
750 CFM 100± Ch. Pn.—150 HP West. S. R.
1—373 cu. ft. 100± Bury-AC Motors.
173 cu. ft. 100± Pres. Chic. Pneu. Belted.
1—90 cu. ft. 100± Pres. Chic. Pneu. Belted.
1—75 cu. ft. 100± Chg. Pneu.-AC Motor.

AC MAGNETIC STARTERS (3 ph. 60 cy.)
200 HP G.E. Rev. Hoist Control, 2200 V.
1—200 HP, 440 v. Enc. reduced v. Comp.
1—150 HP, 440 v. Eng. reduced v. Comp.
7—150 HP, 440 v. Enc. across line switches.
1—125 HP, 440 v. Enc. reduced v. Comp.
7—75 HP, 220 v. Enc. across line switches.

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1—112 G3A Goodman 220 Volts
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1—8 ton Goodman 250 Volts 36″ Gauge
4—8 ton GE 250 Volts 36″ gauge
1—6 ton GE Trolley and Battery combination
2—6 ton Goodman type 2600 250 Volts

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4—5 BU Jays 250 Volts 42″ gauge

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FOUR WHEEL TRAILERS
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Model 1201 Lima High Lift Shovel. 42' boom, 32' stick, 2½ yard dipper, Cummins L diesel engine.

Model 1001 Combination High Lift Lima Shovel and Dragline. 36' 6" boom, 27' stick, 2½ yard dipper, 80' boom, 2½ yard bucket.

Model 1001 Lima Dragline, 80' boom, 2½ yard bucket, 7x7 Waukesha-Hesselman engine.

Model 1001 Lima Combination Shovel and Dragline. 35' 6" boom, 27' stick, 2½ yard bucket, Waukesha-Hesselman engine, 80' dragline boom.

Northwest 80-D Combination 2½ yard Diesel Shovel and Dragline. New.

95 Lorain Dragline. Waukesha-Hesselman diesel engine, 75' boom, 2½ yard bucket.

K-48 Link-Belt Dragline. 75' boom, 2¼ yard bucket, D17000 Caterpillar engine. Kohler light plant.

855-B P&H Diesel Shovel. 26' boom, 16' stick, 2 yard dipper.

44-B Bucyrus-Erie Combination Shovel and Dragline. Standard shovel front, 75' dragline boom, 2 yard bucket, Kohler light plant.

3500 Manitowac High Lift Shovel. 45' boom, 34' stick, 2 yard dipper.

Model 820 Lorain 2 yard Diesel Shovel. New.

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Model 750 2 yard P&H Combination Diesel Shovel and Dragline.

Model 8 Northwest Dragline. Murphy diesel engine, 70' boom, 2 yard bucket.

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Model 602 Lima 1½ yard Combination Diesel Shovel and Dragline.

34-B Bucyrus-Erie. 1½ yard dipper, D13000 Caterpillar engine.

34-B Bucyrus-Erie Combination Front Shovel and Clamshell. 50' clamshell boom, 1¼ yard dipper, D13000 Caterpillar engine.

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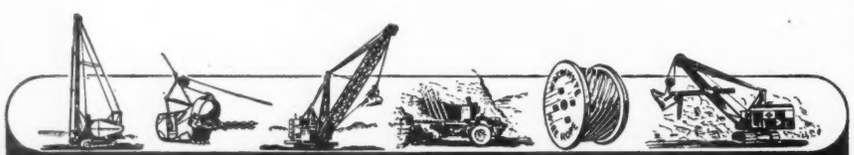

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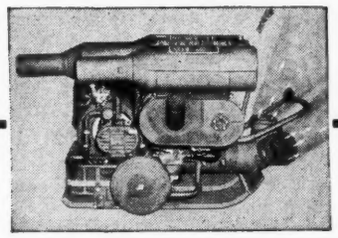

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One Jeffrey L-400 Loading Machine, 36 Gauge Track Mounted. For Inspection Arrangements write

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Coal Tipple—3 Tracks—Shaker Screens — Picking Tables — Loading Booms — Fully Equipped.

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Joy Mechanical Coal Loader — Type 5 B. U.

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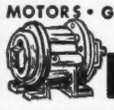

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1—Stephens Adamson 30x30 double roll crusher. Will crush from 2" down to 1¼".

1—Link Belt 30x60 double roll crusher, equipped with gear drive.

1—McNally Pittsburgh 24x30 single roll crushers.

1—American Pulverizer crusher ±1627. Type AC, machine number AC3B, crushes from 20" down to ½".

1—Jeffrey 24x24 single roll crusher, Serial ±1798, Flat pulley driven.

FAN

1—Bayley ±17 Plexiform fan, Type F, wheel diameter 93½", circumference, 24.478 ft. outlet area, 39,376 sq. ft. Capacity ranges from 39,376 CFM at outlet velocity of 1,000 to 141,759 CFM at outlet velocity of 3,600.

LOCOMOTIVES

1—6-ton Goodman locomotive, serial number 4227, type 3304T, steel tires, plain bearings, 36" gauge.

2—4-ton Westinghouse locomotives, serial numbers 46077 and 46353, ball bearing, 36" gauge.

1—5-ton Goodman locomotive type W12A5, ±963, overall dimensions, length 11', height 30", width 47", wheelbase 31", 42" gauge.

1—6-ton G.E. locomotive, classification LM2T6MM5—serial number 5837, 250 volts DC, 36" gauge, 45" wide overall, height 33", overall height 38½", wheelbase 44", 30" wheel diameter, overall length 13', R86E type controller.

1—4-ton Mancha Battery locomotive serial ±845, 36" gauge, standard A, 10' 9" long, 4' 4" wide, 3' 5" high off rail.

1—6-ton Mancha Battery locomotive serial ±819, 36" gauge, armored tank, 13' long 4' 10" wide, 3' 4" high off rail.

1—8-ton Goodman locomotive serial ±2379, type 3214T, 42" gauge, 13' long, 5' 4" wide, 2' 11" high complete with gathering reel.

1—10 G. E. locomotive serial ±8908, 36" gauge.

MINING MACHINES

2—Sullivan type CII8, AC longwall mining machines, 3 phase, 60 cycle, 220 volt, 30" cutter bars, complete with 300' each of 3 conductor mining machine cable.

1—Sullivan CE7, AC shortwall mining machine, 3 phase, 60 cycle, 220 volts, 44" gauge, 6½" cutter bar. Complete with tip turn trucks.

5—Goodman type 512DG3A, AC shortwall mining machines. Complete with cable and jacks. 8' cutter bars. No trucks.

1—Jeffrey 35BB, AC shortwall mining machines. 6' cutter bars, complete with tip turn trucks, cables and reels.

1—Sullivan shearing machine type CH11, 250 volts DC, 42" gauge, 7½' cutter bars.

1—Sullivan shearing machine type CH11, AC, 3 phase, 60 cycle, 220 volts, 36" gauge, 7½ cutter bar.

1—Goodman Universal 112EG3A, AC Shortwall mining machine, 3 phase 60 cycle, 220 volts, 6' cutter bar complete with cable and reel.

HOISTS

1—Ottumwa Iron Works single rigid cylindro-conical drum hoist, serial number 4080, complete with remote control and hydraulic brakes, constructed for following hoisting conditions: Weight of cage 6000±, weight of car 1600±, weight of coal average 2500±, total cage travel 277 ft. (HMD) size of rope 1⅛", trips per hour 78, rest period, 15 sec. Balanced hoisting without slack rope, end lift. Post brake 72" diameter; 8" face. Direct connected to Western Electric 150 HP motor, 3 phase, 60 cycle, 2200 volts, slip ring, speed full load, 700 RMP, complete with automatic switchboard.

Other types and sizes of hoists, with and without motors.

BELT

1—Lgth. Rubber Belt 329'5", 48" wide, 32 oz., 5 ply.

PUMPS

All sizes and types of pumps.

We are distributors for John A. Roebling's Sons Company wire rope and fittings.

GAVENDA BROTHERS, Inc.

CANTON, ILLINOIS

VIBRATING SCREENS CRUSHERS — SCALES

Immediate Shipment

3'x6'—1 deck Vibrat. Screen	$495.00
3'x6'—2 deck Vibrat. Screen	595.00
3'x8'—1 deck Vibrat. Screen	585.00
3'x8'—2 deck Vibrat. Screen	685.00
3'x8'—3 deck Vibrat. Screen	885.00
Stoker Coal Crusher	395.00
Large Coal Crusher	895.00
Coal Crusher with capacities to 215 T.P.H.	2950.00
15 Ton Truck Scale	450.00
20 Ton Truck Scale	510.00
5 Ton Tipple Scale	260.00

Many types of conveyors.

BONDED SCALE COMPANY

2190 S. Third St., Columbus 7, Ohio

Phone GA 5712 UN 2832 Evenings

Visit our factory. We manufacture more than 150 models of Scales, Screens, Crushers, and Conveyors. Inspect several models in operation.

P & H 700 Diesel Crawler Dragline.
105 Ransome Concrete Mixer, rebuilt.
12½-ton Whitcomb Gas Loco., 56½" ga., rebuilt.
20-ton Plymouth Gas Loco., 56½" ga., rebuilt.
35-ton Davenport Besler Gas Loco., 56½" ga.
75 B Lorain Gaso. Crane.
77 Lorain Gas Shovel and Crane.
20-ton Ohio Steam Loco. Crane, 8-wheel, 50' boom.
2—60" x 42' Revolving Stone Screens.
Single Drum Hoist, drum 26" x 12", 14" Flanges.
Northerner Railroad Inspection Car.
8- 5- 6- and 8-ton Gas Locos., 36" ga.

McCartney Machinery Co.

7525 Market St. Youngstown, Ohio

FOR SALE

Semi-Diesel Engines

2—Model 47A0I2, Semi-Diesel, 55 H.P., Fairbanks-Morse Engines, and Equipment. Price $1600.00 each, $3000.00 both. Mine, I mile North of Routes 43 and 80, half way between Waynesburg and Malvern, Ohio.

THE J. G. THOMA COAL CO.
R. R. 3, Minerva, Ohio

SURPLUS EQUIPMENT FOR SALE—

IMMEDIATE DELIVERY

ATTACHMENTS

Code	Qty.	
1A	1	¾ Yard Back-Hoe for Bucyrus-Erie 29-B Shovel.

COMPRESSORS

1B	1	Ingersoll-Rand Stationary Air Compressor, Class ERI, 12x10.
5B	1	Ingersoll-Rand Stationary Air Compressor, Class ERI, 14x12.
6B	1	Gardner-Denver Stationary Air Compressor, Class XH, 7x6.

CRUSHERS

5C	1	10A Telsmith Primary Crusher. Size 10x 51, 700 RPM, 38 to 57 TPH, settings 1½" to 2".
6C	1	No. 6 Gates Crusher, Style K, Size 14x 52, 350 RPM, 40 to 72 TPH, Settings 2" to 3½".

GENERATORS

2DA	1	General Electric Alternating Current Generator, Type ATB-28-125-257, 2300 V, 31.5 A, 245 RPM, 135 HP.
2DB	1	General Electric Continuous Current Generator, Compound Wound, Type CVC-115, 9½ KW, 125V.
2DC	1	Wiley Direct Current Generator, 50 KW, Direct connected to Ridgeway Steam Engine, 125 V, 440 A.

LOCOMOTIVES

3EA	1	5-ton Plymouth Locomotive, Gas Model FLB, Type 2, 36" Gauge Buda Engine Mdl. KTU.
3EB	1	7-ton Plymouth Locomotive, Buda Engine Model BTU, 36' Gauge.
2E	3	8-ton Plymouth Locomotives, Model DLB, Buda Engine, Model FRH, Standard Gauge, Good running condition.
3EC	1	12-ton Plymouth Locomotive, Model JLC, 36" Gauge Climax Engine, Model R6U.

MILLS

2F	1	New Holland Roll Mill, 16", Shop No. 1124.

DIRECT CURRENT MOTORS

2GA	1	Jantz & Liest, 20 HP, 110 V, 1050 RPM.
2GB	1	Emerson, 1 HP, 115 V, 1750 RPM.
2GC	1	Emerson Regulating Starter, Cutler Hammer, for above motor.
2GD	1	Emerson, 1 HP, 115 V, 1750 RPM.
2GE	1	Emerson, Regulating Starter, General Electric, for above motor.
2GF	1	Allis-Chalmers, 20 HP, 110 V, 1000 RPM.
2GG	1	Allis-Chalmers Starter and switch for above motor.
2GH	1	Jantz & Liest, 7½ HP, 110 V, 900 RPM.

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To arrange for inspection communicate with

THE KENTUCKY STONE COMPANY, INC.

214 Fincastle Building Louisville 2, Kentucky

Phone WA 7424

for IMMEDIATE DELIVERY *of* RUBBER PRODUCTS

CONVEYOR BELTING, TRANSMISSION BELTING, ELEVATOR BELTING, FIRE, WATER, AIR, STEAM, SUCTION and WELDING HOSE.

CALL WIRE WRITE **CARLYLE**

THE RUBBER HEADQUARTERS

CARLYLE RUBBER PRODUCTS ARE NEW, GUARANTEED & LOW PRICED

CONVEYOR BELTING

ABRASIVE RESISTANT COVERS

Width	Ply	Top-Bottom Covers	Width	Ply	Top-Bottom Covers
48"	8	1/8" — 1/16"	24"	4	1/8" — 1/32"
42"	5	1/8" — 1/16"	20"	5	1/8" — 1/32"
36"	6	1/8" — 1/16"	20"	4	1/8" — 1/32"
30"	6	1/8" — 1/16"	18"	4	1/8" — 1/32"
30"	5	1/8" — 1/16"	16"	4	1/8" — 1/32"
26"	5	1/8" — 1/32"	14"	4	1/16" — 1/32"
24"	5	1/8" — 1/32"	12"	4	1/16" — 1/32"

Inquire For Prices — Mention Size and Lengths

NEW

TRANSMISSION BELTING — ENDLESS "V" BELTS

HEAVY-DUTY FRICTION SURFACE

	Width	Ply	Width	Ply	Width	Ply
Inquire For Prices — Mention Size and Lengths.	18"	6	10"	6	6"	5
	16"	6	10"	5	5"	5
	14"	6	8"	6	4"	5
	12"	6	8"	5	4"	4
	12"	5	6"	6	3"	4

"A" Width All Sizes —
"B" Width All Sizes —
"C" Width All Sizes —
"D" Width All Sizes —
"E" Width All Sizes —

Sold in Matched Sets.
Inquire For Prices — Mention Size and Lengths.

GUARANTEED

SPECIAL OFFER . . . HEAVY DUTY RUBBER HOSE

FIRE HOSE

APPROVED SPECIFICATION HOSE EACH LENGTH WITH COUPLINGS ATTACHED

I.D. Size	Length	Per Length
2½"	50 feet	$28.00
	25 "	16.00
2"	50 "	23.00
	25 "	13.00
1½"	50 "	20.00
	25 "	11.00

Specify Thread On Couplings

AIR HOSE

I.D. Size	Length	per Length	Universal Couplings
½"	25 feet	$5.00	$1.50 Pair
	50 "	10.00	1.50 Pair
¾"	25 "	7.50	1.50 Pair
	50 "	15.00	1.50 Pair
1"	25 "	10.00	1.50 Pair
	50 "	20.00	1.50 Pair

LARGER SIZES ALSO AVAILABLE
All Prices—Net — F.O.B. New York

WATER HOSE

I.D. Size	Length	per Length	I.D. Size	Length	per Length
¾"	25 feet	$4.25		35 feet	$10.50
	50 "	8.00		40 "	12.00
1"	25 "	6.25		50 "	15.00
	50 "	12.50	1½"	25 "	10.00
1¼"	25 "	7.50		35 "	14.00
				50 "	20.00

Each Length with Couplings Attached

CARLYLE RUBBER CO., Inc.

62-66 PARK PLACE, NEW YORK 7, N. Y. Phone: BArclay 7-9793

NOW install your own!

Quick, 2-Way Communication

WITH

ARMY FIELD TELEPHONES

CANVAS CASE

Performance equals best present day commercial telephone up to 17 miles!

BATTLEFIELD PROVEN

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EASY TO USE

Now you can quickly establish *on-the-job 2-way communication* from office or temporary headquarters . . . on the surface or underground. Easy to install. Just hook up terminals to any two-strand wire; up to four phones on same line if desired.

Operates on standard flashlight batteries. Compact . . . rugged . . . portable. Saves time. Promotes safety . . . efficiency. Every shipment includes free 50 ft. sample army field wire.

Write for Free Folder!

NEW per pair, complete with heavy canvas case, $29.50; Leather, $32.50.

USED per pair, complete, either case, $19.50.

Compact, portable Switchboards—for systems of 4 to 24 phones:

NEW, $125.00 **RECONDITIONED, $75.00**

Extra Wire. New. 500 ft., $3.50; ½ mile reel, $10.50; 1 mile reel, $16.00.

ORDER BY MAIL! Send check or money order to

LORIS SALES

P. O. Box 2414, Dept. 3 Sacramento, California

MINE SHAFT HOIST

Ilgner Ward-Leonard Shaft Hoisting Equipment. Vulcan No. 822 Hoist, Double Drum, Hoisting Height 280', 1⅜" rope, rope full speed 2,000 FPM, 200 strips per hour. Capacity is cage and car weighing 15,000 lbs. and weight of load 5,000 lbs.

This unit is complete with 475 HP direct connected DC motor; MG set 350 HP, 6,600 V., 3 Ph., 60 Cy. Wound Rotor Motor direct connected to fly-wheel and 400 KW DC Generator. Control panel with primary and secondary control of motor and DC control for generator and DC Hoist Motor.

ISLAND CREEK COAL CO.

Purchasing Department

Holden **West Virginia**

Locomotives, Shovels, Cranes, Crushers, Compressors, Hoists, Belt Conveyors, Screens, Feeders, etc.

A. J. O'NEILL

Lansdowne Theatre Bldg.

LANSDOWNE, PA.

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Immediate Shipment

480,000 lbs. 5½x9/16 New Standard Railroad Spikes.

Still in original kegs.

Priced Far Below Warehouse Price.

Write, Wire, Phone

GLAZER STEEL CORP.

Knoxville, Tenn. **Phone 4-8601**

FOR SALE; BRAND NEW and slightly used wire rope: 2¾", 2½", 2⅛", 2", 1⅞", 1¾", 1½", 1⅜", 1¼", 1⅛", 1", ⅞", ¾", ⅝" and 9/16"; **BRIGHT** and galvanized; **WIRE** and hemp centers; 6 x 7, 19 and 37 construction; (for all purposes) different grades and lengths; **CHEAP**; inspection before shipment or on arrival at **DESTINATION**; above located in **EAST** and **MIDDLE West. WANTED**: used conveyor belts; Mine and incline **HOISTS.**

F.S. 2157, Coal Age,
520 N. Michigan Ave., Chicago 11, Ill.

SELLING EVERYTHING

COMPLETE LIQUIDATION OF A MECHANIZED CONVEYOR MINE

HARD-TO-GET ITEMS

IMMEDIATE DELIVERY

CONVEYORS

2 Goodman G-20 shaker conveyors 300′ of pan line, 90° turns, Swivels, lagged pans, 250 Volts D.C. PERMISSIBLE.

9 Goodman G-12½ shaker conveyors underneath drives, 300′ of pan–line, 90° turns, plain and lagged pans, 250 Volts D.C. PERMISSIBLE

2 Goodman AIG Duckbill Loading Heads.

2 Goodman Elevating Conveyors 250 Volts D.C. PERMISSIBLE

HOISTS

1 Brown Fayro Conveyor Car Hoist 10 HP, 250 Volts D.C., with remote control. PERMISSIBLE

1 Shaft Hoist 250 HP, double conical drums, 440 Volts A.C.

1 Slope Hoist 82 HP, single drum 600′ of 7/8 inch rope.

PUMPS

7 Austin Piston Pumps, 5x6, anti-acid bronze water heads, with or without 250 Volts D.C. motors and starters.

2 Weinman centrifugal, 3x3, acid resisting, Duraloy water heads and impellers, 250 Volts D.C., motor and starters optional.

1 Weinman centrifugal 5x5. As above

CUTTING MACHINES

7 Goodman 112CA Shortwall Cutting Machines 6½′ to 7½′ cutter bars, power take-offs, rebuilt at Goodman shops, 250 Volts, D.C. 50 HP Universal. FLAMEPROOF

6 Goodman 12AA Shortwall cutting machines 50 HP standard, 6½′ to 7½′ cutter bars open type, 250 Volts D.C.

DRILLS

11 Jeffrey A-7 hand held drills 250 Volts D.C. Safety clutches, Augers. PERMISSIBLE

LOCOMOTIVES

7 Westinghouse 904-C's 6 Ton Gathering crab reels, 250 Volts D.C., 36″ Gauge. Gauge can be widened and cable reels installed.

PIPE

3500 feet 6″ Cast Iron Cement lined.

3000 feet 4″ Cast Iron Cement lined.

4000 feet 2″ Oil Well Tubing, T & C.

SAFETY

First aid kits, stretchers, surgical supplies, oxygen breathing apparatus, gas masks, fire extinguishers, safety lamps.

ROCK DUSTER

M.S.A. high pressure, high capacity, 250 Volts D.C. PERMISSIBLE

SHOP EQUIPMENT

Drill presses, shears, band and rip saw, trip hammer, grinders, chain blocks, vises, anvils, hand tools.

RELAYING RAIL

200 Tons 40#, 125 tons 60#, 250 tons 85#.

100 Tons Timber Rail.

50 Tons Timber H Beams.

MINE CARS

150 Composite wood and steel, 36″ Gauge, Lift end gate, Timken roller bearings.

MOTORS

150 HP General Electric, 2200 Volt, 3 phase, 60 cycle, 575 R.P.M.

150 HP Westinghouse, 2200 Volt, 3 phase, 60 cycle, 750 R.P.M.

CHAIN CAR HAULS

2 Complete with motors and control, excellent shape, adaptable to shaft, slope or tipple.

MISCELLANEOUS

Axes, picks, shovels, bolts, rivets, spikes, bearings, spare parts, trolley and feed line hangers and clamps. Other items.

3 TRACK STEEL TIPLE

Steel tipple containing bins, hoppers feeder, shaker screens, conveyors, chutes, picking tables, loading booms, crushers, refuse disposal equipment, 440 volt, 3 phase, 60 cycle motors, 2,500 tons per day capacity. Suitable for shaft, slope, drift or strip mines. Complete erection drawings are available to purchaser.

CALL, WIRE OR WRITE FOR DETAILS

F. A. STOUGHTON - *Agent*

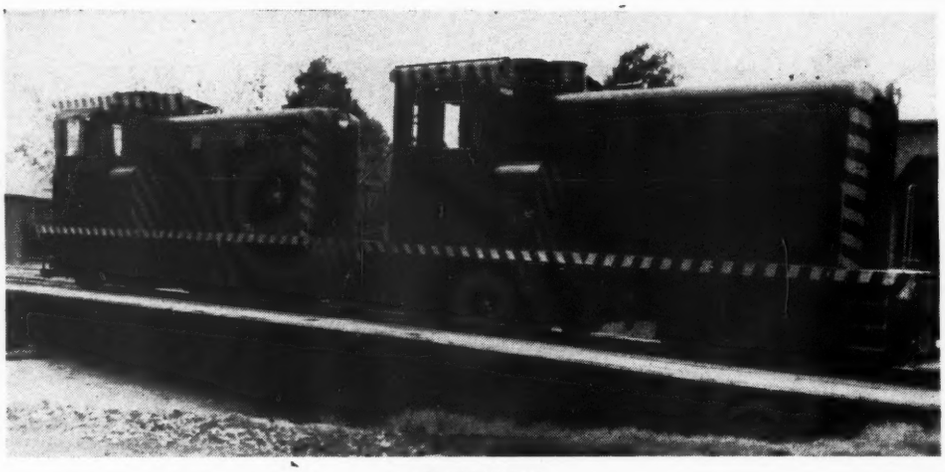
LANGELOTH MINE, (30 MILES WEST OF PITTSBURGH) **P. O. BOX 436, SLOVAN, PA.**

TELEPHONE: BURGETTSTOWN PA. 554.

Immediate Delivery

44 TON DIESEL-ELECTRIC LOCOMOTIVES!

New 1942 — Four (4) Traction Motors — Speed 40 M.P.H.



SPECIFICATIONS:
Wheelbase—(Truck) 7'0"; Length over couplers 33'10"; Height above rail 14'1½"; Radius of Sharpest Curve 50'; Maximum safe speed 40.7 M.P.H.; Drawbar Pull—27,000 lbs.; Diesel Unit—one Cooper-Bessemer Model EN, 310 HP at 900 RPM.; Westinghouse Electrical Equipment; Brakes—Westinghouse EL-14; Immediate Inspection Under Operation!

Two 50 Ton Steam Switchers New 1942
Type 0-6-0, side tank type, H. K. Porter steam switching locomotives, wheelbase 10', pressure 210 lb., tractive effort 21,360 lb., new 1942.

45 Ton Industrial Type, New 1941
One 300 HP, 45 ton diesel-electric locomotive, new 1941, Cummins diesel units, two Westinghouse Traction motors, tractive effort 27,000 lbs., speed 20 M.P.H.

Six 80 Ton 0-6-0 Steam Switchers New 1942-44
Six excellent switching locomotives comparing favorably with new units, 21 x 28" cylinders, tractive effort 40,000 lbs., at Texas, New York and California locations.

65 Ton 400 HP Unit New 1941
Type 0-4-4-0 GE Diesel-Electric, new 1941, tractive effort 39,000 lbs., Hercules diesel units, maximum speed 40 M.P.H., located Missouri.

50 All Steel Fifty Ton Capacity Hopper Cars
All steel twin hopper cars, open top, self clearing, 50 ton capacity in good ICC Interchange condition for immediate delivery.

Write — Phone — Wire

PAN-AMERICAN ENGINEERING CO.

P. O. BOX 2576 Telephone L.D. 339

Dallas, Texas

Two 50 Ton Fireless Steam Locomotives
FIRELESS Steam locomotives for plant switching, one built by Porter 1942, the other in 1937. Good condition. 22"x18" cylinders, piston valves.

MOTORS

2200 V. 60 CYC., 3 PH.

1—50	H.P.,	G.E. KR 527	1800 RPM.
1—50	"	G.E. MT Slipring	695 "
2—60	"	Westinghouse CS SB	1800 "
1—100	"	G.E. KT	1800 "
1—100	"	G.E. I-K	1800 "

220/550 V.

1—50	H.P.,	G.E. MTY 346	690 RPM.

440 V.

1—30	H.P.,	Westinghouse CI, 638	900 RPM.
1—30	"	Westinghouse CI	690 "
1—35	"	Westinghouse CI 652-D	690 "
1—35	"	G.E. ITC 5012	1200 "
1—7½	"	G.E. MT	1200 "
1—7½	"	G.E. MT	900 "
1—150	"	G.E. IM	600 "
1—100	"	G.E. IM	430 "

PENN ELECTRICAL ENGINEERING COMPANY

SCRANTON, PA.

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MOTORS—M. G. SETS—CONTROL

In Stock—Immediate Shipment—Rebuilt & Guaranteed

SQUIRREL CAGE MOTORS
3-PHASE, 60-CYCLE

Qu.	H.P.	Make	Type	Volts	R.P.M.
7	10	Whse.	C.S.	440	575
1	10	G.E.	HT-753	440	850
1	10	G.E.	E.R.	440	1090
1	10	G.E.	K-324	208	1750
1	10	Al.-Ch.	X	220	1750
1	15	G.E.	M.T.	440	900
1	15	G.E.	N.P.	440	1160
1	15	G.E.	K.T.	440	3500
1	20	G.E.	X.K.	220	865
1	25	G.E.	F.T.H.	220	575
3	125	Al.-Ch.	K.T.	220	900
1	125	Al.-Ch.	C.S.	220	1100
1	25	Whse.	I.M.	2200	1200
1	35	G.E.	N	220	560
1	40	F.M.	A.H.	440	860
2	40	Al.-Ch.	B	220	1150
2	40	F.M.	K.T.	220	1800
1	40	C.W.	C3-650	220	1760
1	40	Whse.	X.E.	440	695
1	50	G.E.	C.S.	220	970
4	50	Whse.	K.T.	440	1100
1	50	G.E.	A.T.	440	1750
1	50	Ideal	FTR	440	720
7	75	G.E.	K.T.	440	875
7	75	G.E.	A.R.	440	1750
1	75	Al.-Ch.	A.R.	2200	1750
3	75	Al.-Ch.	E.K.	2300	695
2	100	G.E.	CS-761	440	1750
1	125	Whse.	A.R.	2200	1750
3	125	Al.-Ch.	ARW	2200	1750
1	150	G.E.	I.K.	220	675
1	150	G.E.	I.E.	550	720
1	150	Whse.	C.S.	440	1200
1	200	G.E.	T.K.	2300	490
1	200	Al.-Ch.	A.R.	2200	3550
1	250	Whse.	C.S.	2200	1160

"WE CAN SUPPLY WITH ANY OF THE ABOVE THE NECESSARY CONTROL EQUIPMENT ENGINEERED TO YOUR SPECIFICATIONS."

SLIP RING MOTORS
CONSTANT DUTY—3-PHASE: 60-CYCLE

Qu.	H.P.	Make	Type	Volts	R.P.M.
2	10	G.E.	I.M.	220	1145
1	10	G.E.	I.M.	550	1120
1	20	G.E.	MT-320	220	850
1	25	Al.-Ch.	ANY	2200	860
2	25	G.E.	MT-326	2200	860
1	25	Whse.	C.W.	440	1750
1	30	Al.-Ch.	ANY	440	900
3	40	G.E.	M.T.	580	560
3*	40	G.E.	I.M.	600	1170
1	40	Al.-Ch.	ANY	2200	435
1	60	Al.-Ch.	ANY	2200	490
1	60	Whse.	C.W.	2200	1200
2	75	G.E.	M.T.	2200	500
1	75	G.E.	M.Y.	2200	600
1	75	G.E.	MT-848	440	900
1	100	G.E.	M.T.	2200	600
1	100	Whse.	C.W.	6900	900
1	100	Whse.	M.W.-766	220	1200
1	150	G.E.	I.M.	550	385
3	150	G.E.	M.T.	2200	720
1	150	Whse.	C.W.	2300	1160
1	200	G.E.	I.W.	2300	514
1	200	Cf.Wh.	127-AC	440	590
1	300	Al.-Ch.	ANY	2200	514
1	300	G.E.	I.M.	2200	1200
1	350	Al.-Ch.	ANY	2200	514
1	350	G.E.	M.T.	2200	450
1**	400	G.E.	M.T.	2200	450
1	400	Al.-Ch.	ANY	2300	514
1***	1200	Whse.	C.W.	2500	590

*—40-CYCLE.
**—3-Bearing Motor.
***—MILL TYPE WITH MILL CONTROL.
(MANUAL or MAGNETIC CONTROL for starting duty or reversing & varying speed can be applied. ENGINEERED TO YOUR SPECIFICATIONS.)

ADJUSTABLE SPEED MOTORS

Qu.	H.P.	Make	Type	R.P.M.
2	9	G.E.	R.F.-10	400/1600
1	10	Whse.	S.K.	250/1000
1	10	G.E.	R.F.-12	300/1200
1	10	Whse.	SK-90	400/1600
1	10/15	Al. Ch.	F.B.-100	575/1725
1	15	El. Dy.	R.F.-11	400/1600
3	15	G.E.	10-S	450/1350
1	15	El. Dy.	RF-10	550/1650
1	19	Whse.	5-S	600/1200
1	20	G.E.	SK-100-L	600/1200
1	25	G.E.	R.F.-12	400/1600
1	25	G.E.	C.D.-128	200/800
1	25	Rel.	R.F.-13	400/1200
2	27½	El. Dy.	T-262	500/1500
1	30	G.E.	R.F.-11	500/1500
1	32½	Whse.		450/1350
1	35	G.E.	C.D.M. 105	875/1750
1	35/50	Whse.	SK-150	500/1200
1	50	Whse.	R.F.-14	250/1000
1	50/65	El. Dy.	SK-160	500/750
1	60	Whse.	SK	250/1000
1	150/185	El. Dy.	SK-131	500/1500
1	200/250	Rel.	T-1050	400/1200
			75-S	250/500
			2600-T	400/800

WE CAN SUPPLY WITH THE ABOVE ADJUSTABLE & CONSTANT SPEED MOTORS—Manual—Semi magnetic and manual and fully magnetic AUTOMATIC CONTROL "ENGINEERED TO YOUR SPECIFICATIONS."

MOTOR GENERATOR SETS

(2)—10 KW, General Electric 2-unit sets, 250-VDC., 1800-RPM., 220 or 440-V., 3-Ph., 60-Cy.
(3)—50 KW, Louis-Allis 250-VDC., 1200-RPM., dir. con. to 75-HP. sq. cg. motors, 220/440/2200-V., 3-Ph., 60-Cy.
(2)—90 KW, General Electric 250-VDC., 135-HP. sq. cg. motors, 220/440-V., 3-Ph., 60-Cy., 1200-RPM., B.B., splash-proof.
(1)—3-Unit Set (2) 90 KW, G.E., 250-VDC., Type CD generators, dir. con. to 200-HP. G.E. Syn. Motor, 1200-RPM., 2300-V., 3-Ph., 60-Cy., .8 P.F., with A.C. & D.C. panel & motor control.

SPECIAL:
(1)—Practically NEW 500 KW, Al. Ch. Set, 250-VDC., 900-RPM., 2300-V., 3-Ph., 60-Cy., motor—(3) 333 K.V.A. Whse. dry type Transformers, 13200/2400, synchr. motor control on 132000-V. side of transformers, with complete D.C. panels. We will sell this less transformers with 2300-V. synchr. motor control.
(1)—1000 KW, Whse., 275-VDC. Rotary Converter, A.C. & D.C. Panels (3) 365 K.V.A., Al. Chal. transf., 1-Ph, 60-Cy., 2300-V.

T. B. MAC CABE COMPANY

4314 CLARISSA STREET — PHILADELPHIA, PENNA.

American locomotive crane, capacity 37,800 lbs. @ 15 ft. radius, Waukesha 100 HP gasoline engine, boom length 50 ft., condition good, ready to operate, $9,500.

P&H 1 yd. dragline type 600 A, without bucket, Atlas Imperial diesel, boom 40 ft., requires crankshaft reground and cat links replaced or rebored and rebushed, $4,900, includes new repair parts worth $500.

FOLEY BROTHERS, INC.
Colstrip, Montana

LOCOMOTIVES

American and Lima 80 ton steam switching locomotives new 1944. Type 0-6-0, 6 wheel equipped with tender. Engines are of the latest construction in like new condition, available at very attractive price. Specifications available. Also have several diesel and gasoline locomotives available from stock.

MISSISSIPPI VALLEY EQUIPMENT CO.
511 Locust St. — St. Louis, Mo.

1—Loaded Mine Car Haul for pulling cars on dump, 30 ft. long with AC motor.
1—Empty Car Haul for pulling empty cars away from dump, 50 ft. long with AC motor.
1—Apron Type Feeder 42" wide, 27 ft. long with AC motor.
1—Buddy Sullivan Machine 220 volt, 3 phase.
1—Myers Whaley Loading Machine No. 4 Automat 250 volt. Goodman Underground Shaker Conveyors.
1—Low Vein 8-30, 4 ton Goodman Locomotive, 36" gauge.
1—Scraper Rock Loader, Ingersoll-Rand double drum, 30 HP., 230 volt, overall length 24 ft., height above the rail 5½'.
2—Loading Booms, 5 ft. wide, 30 ft. long. Miscellaneous Scraper Conveyors.
1—Belt Conveyor 42" wide, 400 ft. long.
1—Apron Type Conveyor, 48" x 30'.
Coal Crushers from 12" to 36"x36".
2—Goodman Slabbing Machines.
1—29C or 29B Jeffrey Machine on Joy Caterpillars.
1—29C Jeffrey Machine with revolving head.
Sullivan Bit Sharpeners.

GUYAN MACHINERY COMPANY
LOGAN, WEST VIRGINIA

FOR SALE

1—Brand New Goodman Conveyor Motor G 12-1/2—10 H.P.—220 Volts A. C.
1—55 K. W. Willey Wray Generator 600 RPM,—230 Volts D. C., Switch Board and 33 ft. center 10" leather Belt.
1—20 H.P. Series Wound Westinghouse D. C. Motor.

WANTED

1 G 15 Goodman Conveyor 250 Volts, D. C.

MERRICK COAL MINING CO.
WAYNESBURG OHIO

CONVEYOR BELTS
ONE DAY SHIPMENT

1,675 ft. 36 in. 6 ply — New
1,120 ft. 36 in. 7 ply — Used
362 ft. 30 in. 6 ply — New
1,075 ft. 30 in. 5 ply — New
1,630 ft. 24 in. 5 ply — New
1,020 ft. 24 in. 4 ply — New
1,528 ft. 18 in. 4 ply — New

THE DARIEN CORP.
60 E. 42nd St., New York, N. Y.
Tel. Mu. 2-0042

FOR SALE

We have a 275 KVA Generating Plant, 440 Volt complete with a Type TB 160 H.P. Buckeye Diesel Engine. The sale price for this unit is $2,500.00 as is, where is, f.o.b. our plant, Glass Rock, Ohio.

THE CENTRAL SILICA COMPANY
Masonic Temple — Zanesville, Ohio

FOR SALE

2—4-ton Ironton storage battery locomotives, 42" gauge, without batteries. In Good mechanical condition.

GREAT VALLEY ANTHRACITE COAL CORPORATION
McCoy, Va.

FOR SALE
COAL CRUSHER
AMERICAN PULVERIZER
Type A. C. Serial No. 2258
Complete with V-Belt Sheave
Excellent condition - Immediate delivery
MIDWEST-RADIANT CORPORATION
220 North Fourth St., St. Louis 2, Missouri

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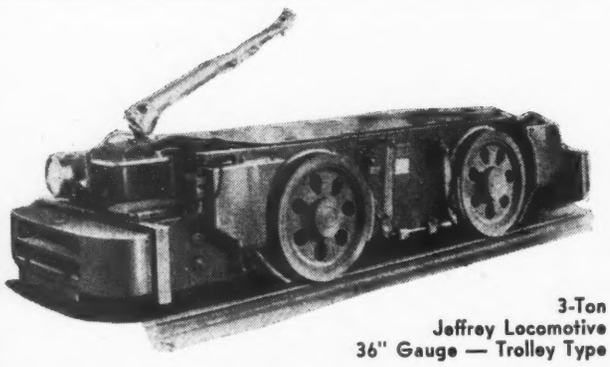
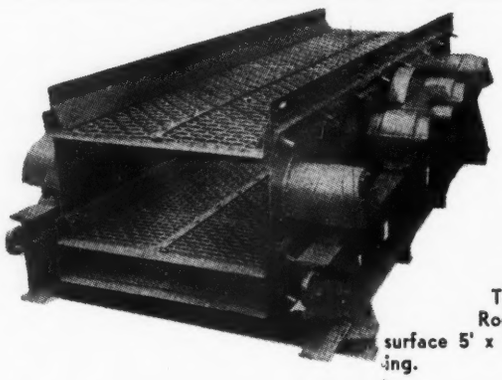
IMMEDIATE DELIVERY

... Three and one-half million dollars in new and nearly new coal mining machinery and equipment

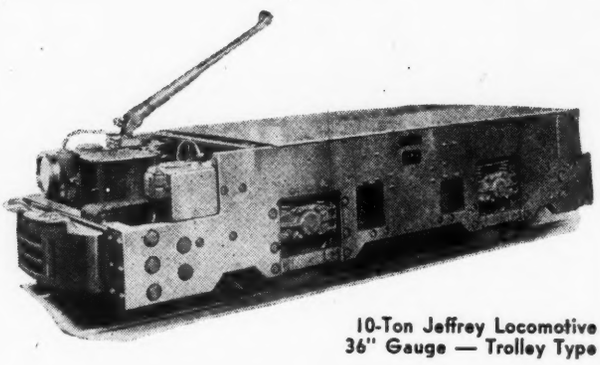


3-Ton
Jeffrey Locomotive
36" Gauge — Trolley Type



Type F-600 Ty-
Rock Screen 2—
surface 5' x 10' Full Float-
ing.

6-Ton Jeffrey Locomotive 36" Gauge — Trolley Type



10-Ton Jeffrey Locomotive
36" Gauge — Trolley Type

20-Ton Goodman Locomotive High Type — 36" Gauge

8-Ton General Electric
Locomotive — 36" Gauge

THE COLUMBINE MINE EQUIPMENT CO., INC.

FLAT IRON BUILDING, 1669 BROADWAY **DENVER 2, COLORADO**

Subsidiary of Portland Equipment Co., 11 Broadway, New York 4, N. Y.

WRITE FOR OUR COMPLETE LIST OF MACHINERY AND EQUIPMENT

SEE PAGE 233 FOR APPROXIMATE SUMMARY OF HARD-TO-GET OFFERINGS

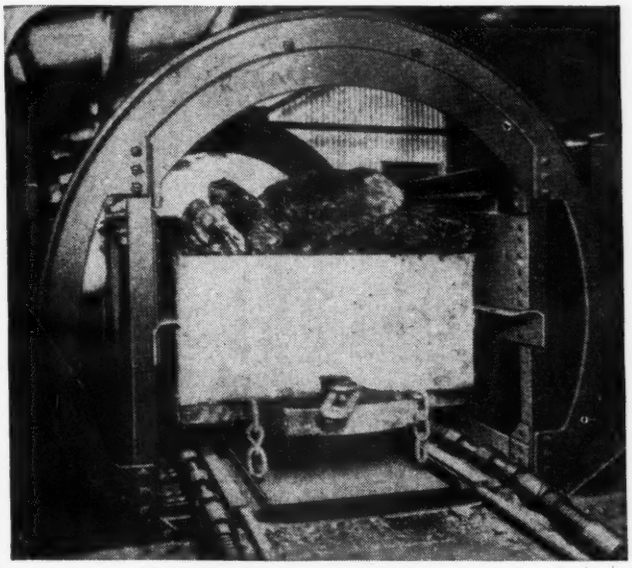
THE COLUMBINE MINE EQUIPMENT CO., INC.

1669 BROADWAY, DENVER 2, COLORADO

... Three and one-half million dollars in new and nearly new coal mining machinery and equipment

Subsidiary of Portland Equipment Co., 11 Broadway, New York 4, N. Y.

Complete Liquidation . . . Immediate Delivery

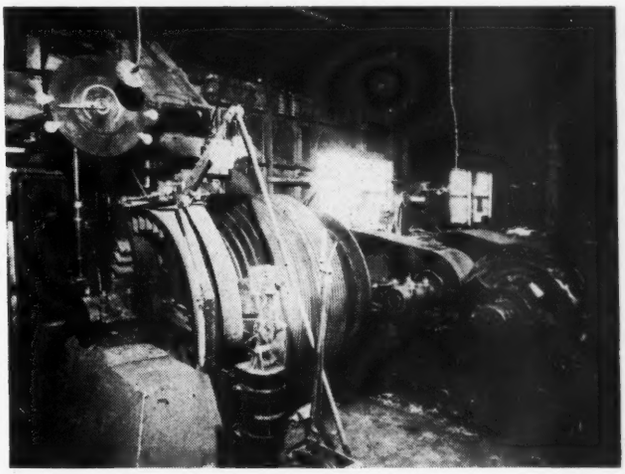


ROTARY CAR DUMPER
Fast Dumping of Coal Cars

HERE ARE SOME OF THE HARD-TO-GET OFFERINGS

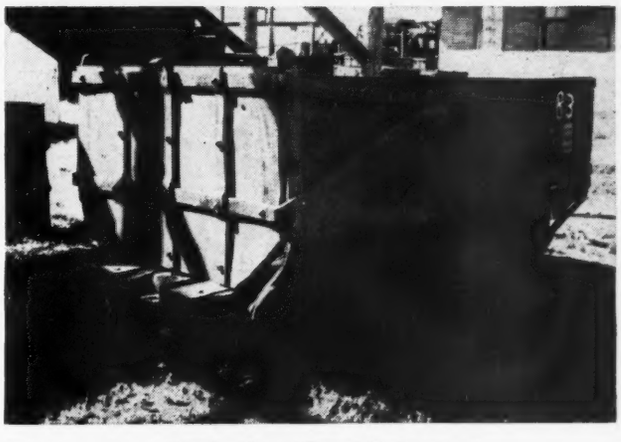
HAULAGE MOTORS, trolley type locomotive—250 Volt D. C.—electrically driven, 36" gauge, General Electric, Westinghouse, Jeffrey and Goodman.
COAL MINING MACHINES—29 L-E "Arcwall" Jeffrey mining machines mounted on Joy electrically driven caterpillar trucks.
Goodman Shortwall No. 112 mining machines.
Goodman 36" Gauge TRUCKS, Type "M."
MINING MACHINE TRUCKS—Joy "T-1."
MOTOR GENERATOR SETS—2 sets 225 H.P. connected to Ridgeway 150 K.W. generators, with panelboards, A.C. and D.C. meters and transformers complete. 2 sets 300 H.P. connected to Ridgeway generators, 200 K.W., complete with panelboards, A.C. and D.C. meters and transformers. And others.
BATTERY CHARGING UNITS—Joy, Westinghouse, Hobart Bros. Co., Electric Products Co.
MOTORS—A.C. and D.C., all types, 1 H.P. to 300 H.P., starting compensators and switches.
TRANSFORMERS—General Electric, Westinghouse, 7½ KVA, 37½ KVA and 150 KVA.
BOX CAR LOADERS—Ottumwa—Manerre.
PUMPS—Geared and centrifugal—motor and belt driven—Gould, Demming, and Myers.
FANS—Jeffrey, American Blower, Sturdevant.
TIPPLE—3 track tipple consisting picking screens, grizzlies, car retarders, end dump, belt conveyors, elevator bucket conveyors, box car loaders complete.
VIBRATOR SCREENS—Ty-Rock Tyler F-600 2 surface 5'x10' Screen, full floating.
SHAKER SCREENS—"Marcus" shaker screens.
CONVEYORS—Flight conveyors, elevator conveyors.
COAL CRUSHERS.
RAILS—250 tons 30 lb., 200 tons 40 lb., 150 tons 50 lb., 150 tons 60 lb., 350 tons 65 lb., 200 tons 75 lb.
SPIKES, bolts, tie plates, frogs, switches, switch throws.
COPPER trolley wire—2/0, figure 8 and 4.0 round.
TROLLEY HARDWARE—Hangers, clamps, frogs, switches, roof hangers.
TRANSMISSION WIRE—Single conductor, 2 conductor, 3 conductor—Neoprene, glass, rubber insulated 2/0 to 500,000 CM.
JOY 7-BU. LOADERS—Caterpillar mounted with high pedestal.
SHUTTLE CARS—Joy 42D storage battery.
ELEVATOR CONVEYORS—Joy.
AIR COMPRESSORS.
MACHINE SHOP—Complete.
ELECTRIC SHOP—Complete.
CARDOX PLANT—Complete.
BATTERIES—Exide and Gould Ironclad, 24 cells.
$150,000.00 WORTH of new parts, bearings, gears, bolts, nuts and screws for Joy, Jeffrey, Goodman, Ottumwa, Manerre, General Electric, Westinghouse, Demming, and other popular manufacturers' equipment.

ALSO THOUSANDS OF ITEMS TOO NUMEROUS TO MENTION.



Cornical Drum Hoist, 300 HP, Drum 8'-6" Dia. x 72" wide

Phillip's Crossover Dump and Car Retarder



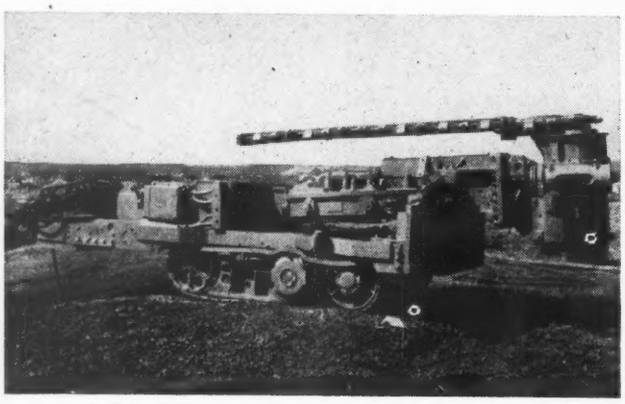
Tipple Car, 2 Ton, 36" Gauge

WRITE FOR OUR COMPLETE LIST OF MACHINERY AND EQUIPMENT

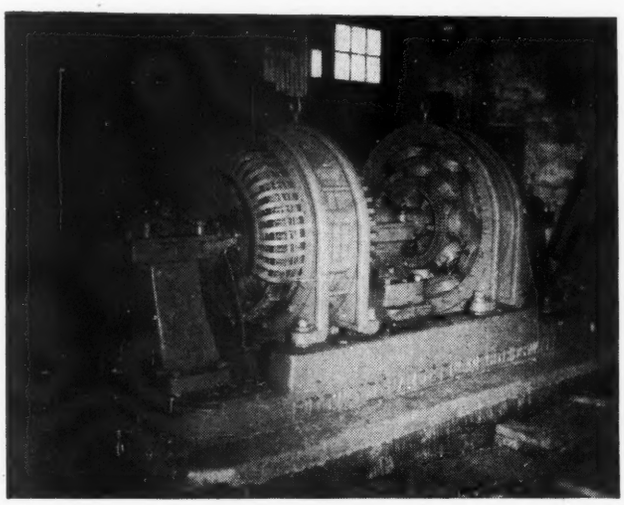
COMPLETE LIQUIDATION

IMMEDIATE DELIVERY

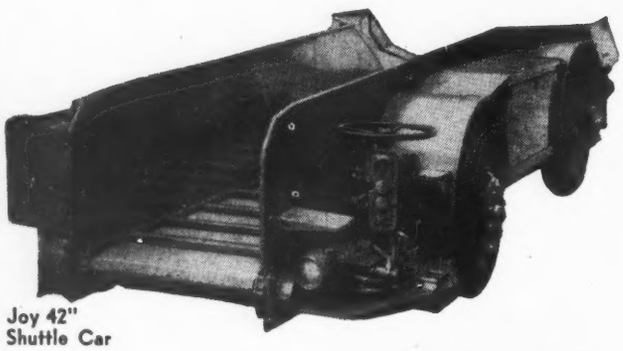
... Three and one-half million dollars in new and nearly new coal mining machinery and equipment



Jeffrey Arcwall 29 L-E Mining Machine

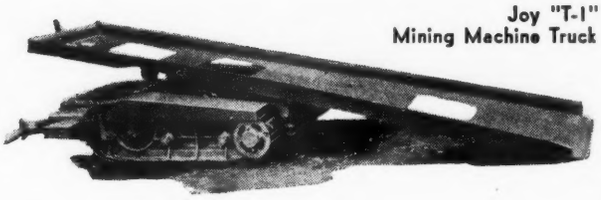


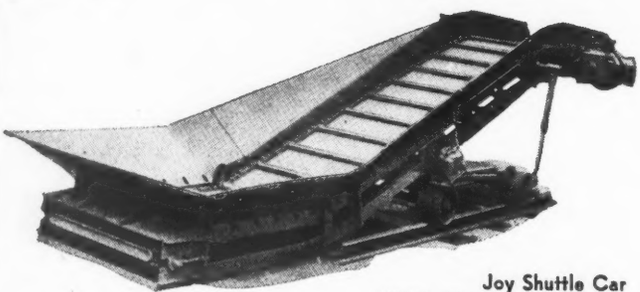
Motor-Generator Sets



Joy 42" Shuttle Car

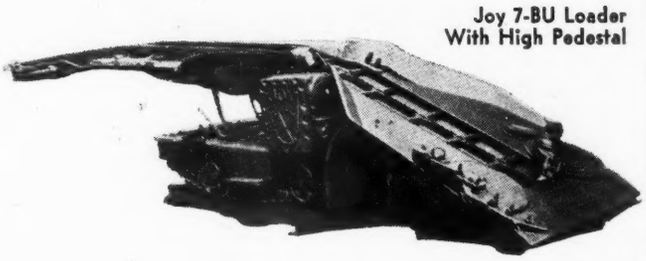
Joy "T-1" Mining Machine Truck





Joy Shuttle Car With Elevating Conveyor

Joy 7-BU Loader With High Pedestal



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THE COLUMBINE MINE EQUIPMENT CO., INC.

1669 BROADWAY, DENVER 2, COLORADO

SEE PAGE 233 FOR APPROXIMATE SUMMARY OF HARD-TO-GET OFFERINGS

COMPLETE LIQUIDATION

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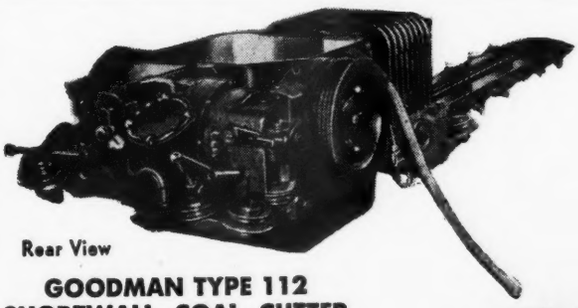
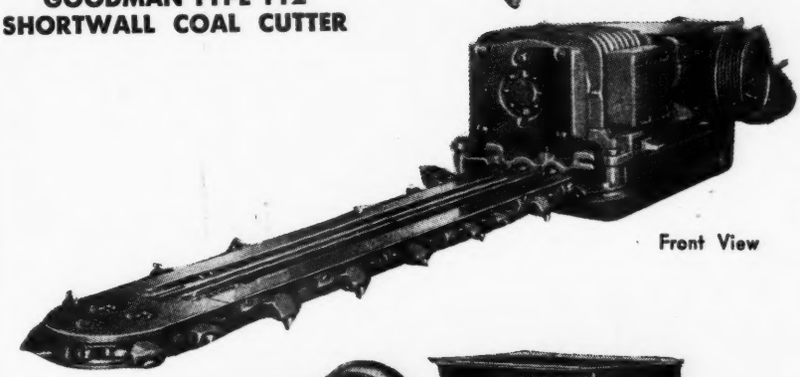
... Three and one-half million dollars in new and nearly new coal mining machinery and equipment

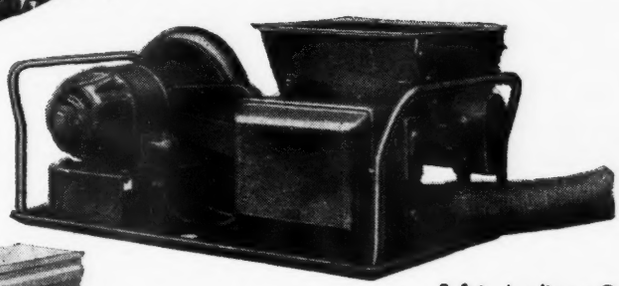


Rear View

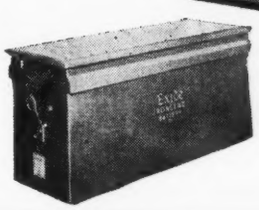
GOODMAN TYPE 112 SHORTWALL COAL CUTTER



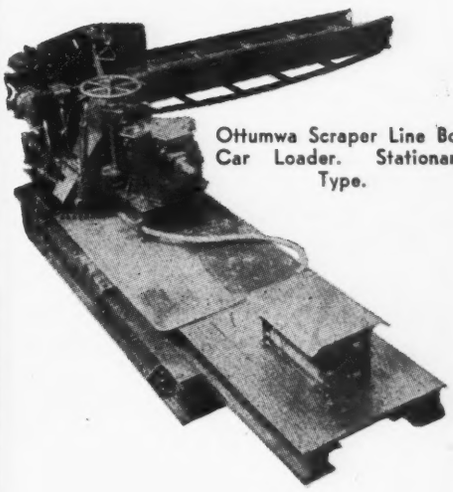
Front View



Safety Appliance Co. Rock Duster

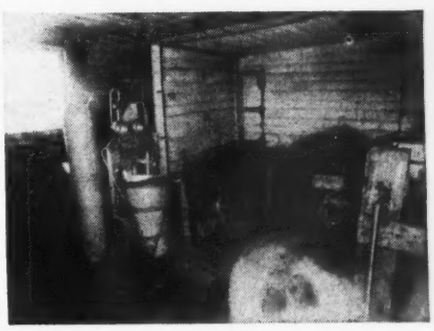


Exide and Gould Ironclad Batteries



Ottumwa Scraper Line Box Car Loader. Stationary Type.

Partial View of Tipple with Grizzlies and Picking Screen.



Complete Cardox Plant, 160 Shell Capacity

TIPPLE CARS, 2 Ton Capacity, 36" Gauge End Dump, Roller and Ball Bearing.

ROTARY CAR DUMPER for 36" Cars With Automatic Control.

HOISTS—1 Double Drum Conical Hoist—Denver Engineering Works—300 HP., Silent Chain Drive, Complete With All Panelboards, Transformers and Controllers and Numerous Others.

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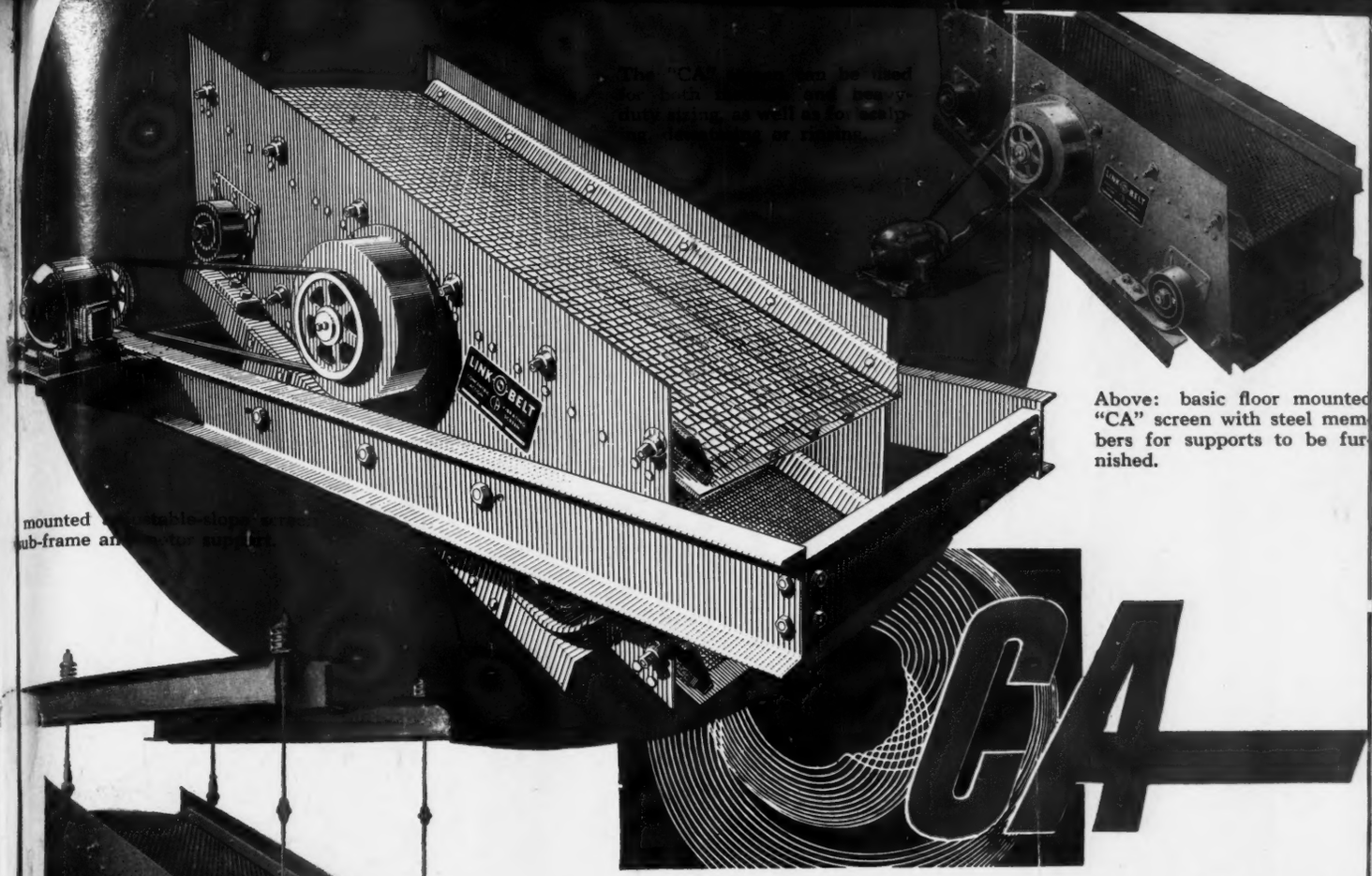


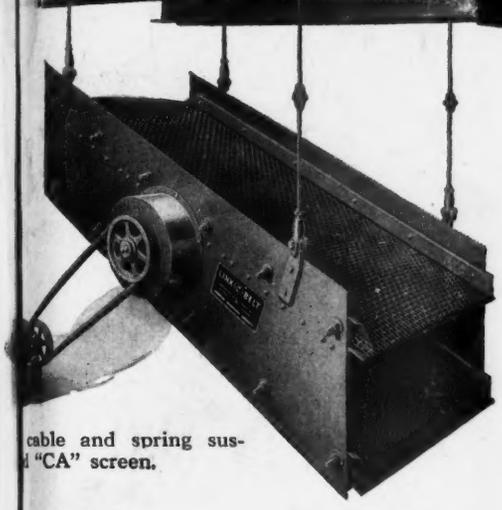
Above: basic floor mounted "CA" screen with steel members for supports to be furnished.

mounted [illegible] sub-frame and [illegible] for support.

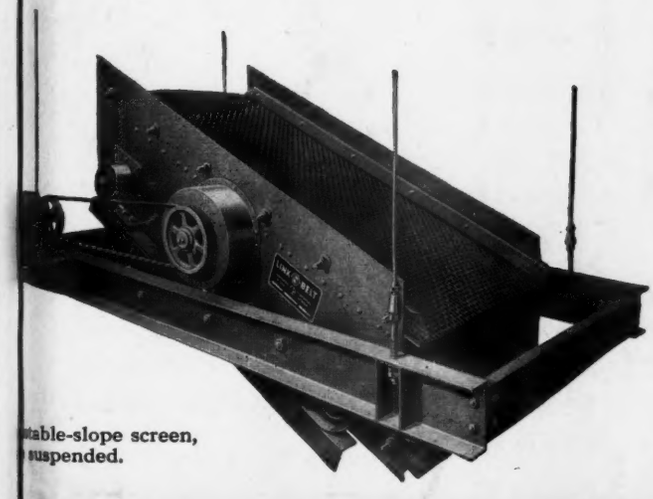
CA

CONCENTRIC ACTION SCREEN

for extreme flexibility in mounting and suspension; high efficiency



cable and spring suspended "CA" screen.



stable-slope screen, suspended.

Praise for the new Link-Belt "CA" Concentric Action Vibrating Screen continues to pile up. Coal operators are pleasantly surprised at its perfection of operation . . . its extreme smoothness in starting and stopping cycles. Overloads do not diminish its efficiency. "CA" high capacity is secured by greater amplitude at high speeds; unobstructed screening surface; true circle vibrating movement; controlled screen cloth tension. There is less abnormal vibration through critical ranges in starting and stopping. It is easily serviced and inspected.

As shown by the illustrations, the "CA" screen has extreme flexibility in mounting and suspension. If you are interested in higher screening efficiency and lower costs, write us for details. Send for Book No. 2154.

LINK-BELT COMPANY

Chicago 9, Philadelphia 40, Pittsburgh, 19, Wilkes-Barre, Huntington, W. Va., Denver 2, Kansas City 6, Mo., Cleveland 13, Indianapolis 6, Detroit 4, St. Louis 1, Seattle 4, Toronto 8.

10,857

COAL PREPARATION AND HANDLING EQUIPMENT

Engineered, Built and Backed by THE SYMBOL OF QUALITY LB LINK-BELT **LINK-BELT**

TRU-LAY *Preformed*

SLUSHER SERVICE

Wire rope takes a real beating in slusher service. Miners know what happens when the rope is cranky . . . and the dangers when some ropes whip and wear prematurely. These dangers can be reduced with TRU-LAY. • You might call it "gilt-edge" wire rope . . . this TRU-LAY. It cuts clean without seizing. It takes bending longer over small sheaves. Its flexibility permits use of constructions that last longer under severe abrasion of buckets, sharp ore and rocks. And when wires do wear through, they don't turn into barbs that will slice a fellow's hand right through his glove. These are the advantages gained by Preforming TRU-LAY. • Add to this the strength provided by the toughest of Improved Plow Steel wires and you get a rope that will stand the gaff. Ask for TRU-LAY Preformed Improved Plow Steel.

AMERICAN CABLE DIVISION
AMERICAN CHAIN & CABLE

Coal Age

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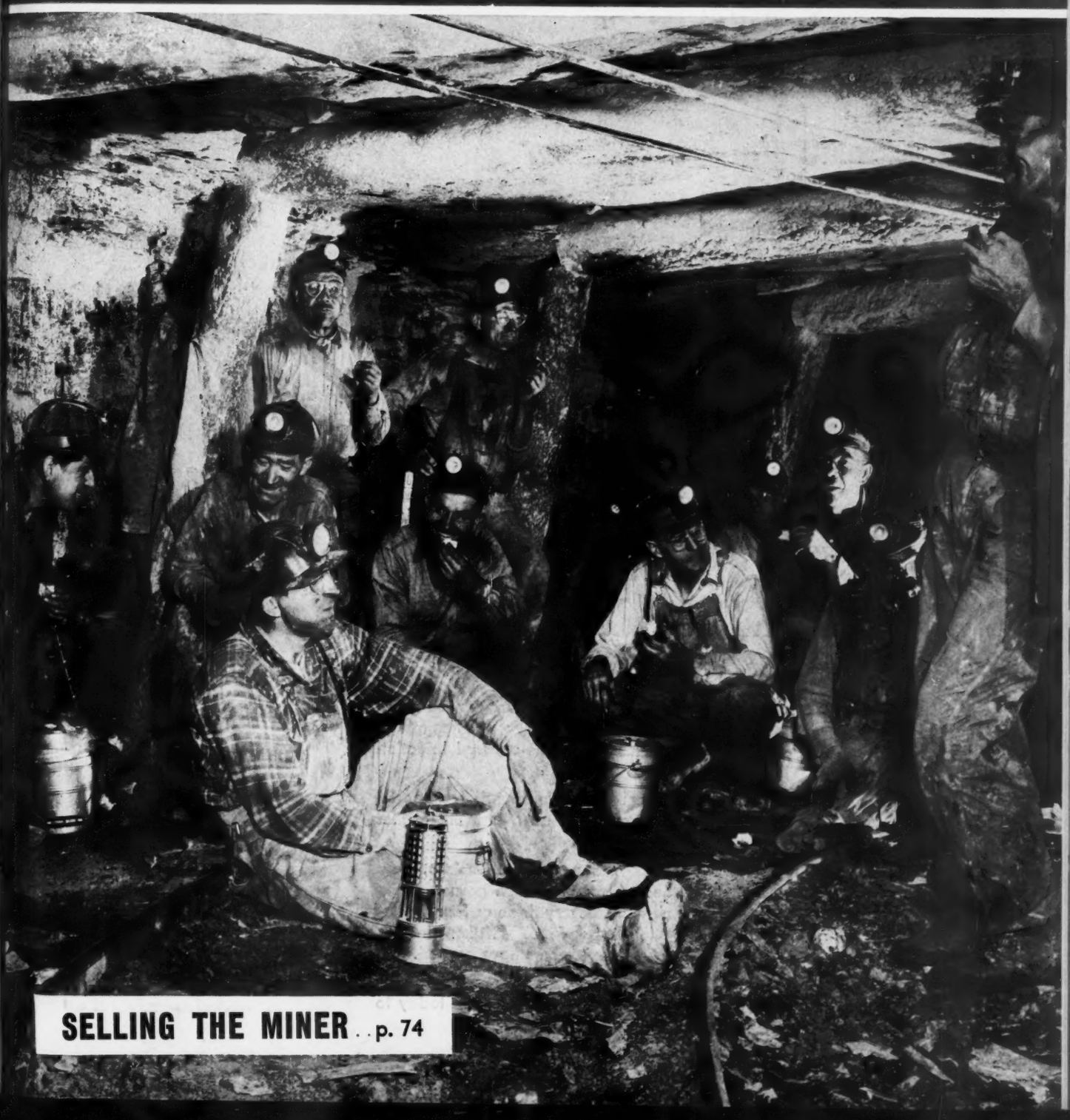
NOVEMBER, 1947



SELLING THE MINER . . p. 74

5½ Times Longer Operating Periods

SUN MINE CAR GREASE . . .

Ends Frequent Time-Out Due to Car Lubrication Problem

A big Pennsylvania mine had trouble with car lubrication. Grease separated and hardened in the bearings in as little as two weeks. Then miners complained of the cars being hard to move, and time out for lubrication was necessary.

A Sun Engineer studied the problem and recommended a special grade of Sun Mine Car Grease, manufactured to meet the conditions that prevailed in the mine.

This special grease, "Job Proved" in dozens of coal mines, stays soft and doesn't separate. Using the recommended Sun grease, maintenance crews found that greasing cars once every three or four months was enough. Now cars stay in operation five-and-one-half times longer. Miners' complaints about the difficulty in moving cars have ceased.

For full information on Sun "Job Proved" oils and greases for all kinds of mine machinery, call the nearest Sun office or write today to Department CA-11.

SUN OIL COMPANY • ***Philadelphia 3, Pa.***
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SUN
SUNOCO
INDUSTRIAL PRODUCTS

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DETROIT

It soaked up the shock of 10 million crashing tons

A typical example of B. F. Goodrich product development

IT WAS only a 390 foot haul—but it proved to be a costly one. Huge hunks of coal had to be carried from a railroad siding to a barge dock on the river bank below. A belt conveyor system was the obvious answer. So one was built and put into service.

Everything was fine—until the belt wore out before it had carried 4 million tons. Now that much coal will heat a lot of houses. But it wasn't enough to make the belt a good investment. The second belt was even worse—just over 3 million. And the third one, which went 5½ million tons, still added too much to the cost of the coal.

Then the coal company—and the mining industry—got a break. B.F. Goodrich belting engineers developed a new kind of belt in which hundreds of individual cords—each completely embedded in rubber—replaced the usual stiff fabric "carcass." They added a top ply with the cords running across the belt. When heavy hunks of material hit the belt it "gives" in both directions—absorbs the shock instead of fighting it. One of these cord belts was installed to carry the coal to the barge dock. Up to now it has handled *over 10 million tons and is still in service.*

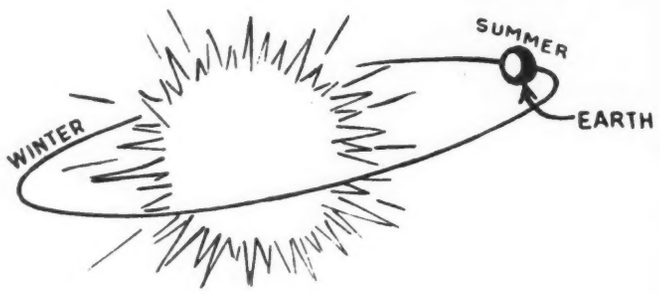
No one knows yet just how much the cord belt will reduce handling costs for this company. But there are records of other cord belts which have lasted *10 times as long* as conventional belts—each one a typical example of the results of B.F.Goodrich research and product development. *The B.F. Goodrich Company, Industrial Products Division, Akron, Ohio.*

B.F.Goodrich
FIRST IN RUBBER

Make no mistake

FOR INSTANCE...

Are you mistaken about the SUN?



Most people think the Sun is further from the Earth in Winter than Summer, because the Northern hemisphere is warmer in Summer. In reality, the Sun is millions of miles closer to the Earth in Winter! The Earth's orbit is not an exact circle, but an ellipse; and the Sun is a little to one side of the center.

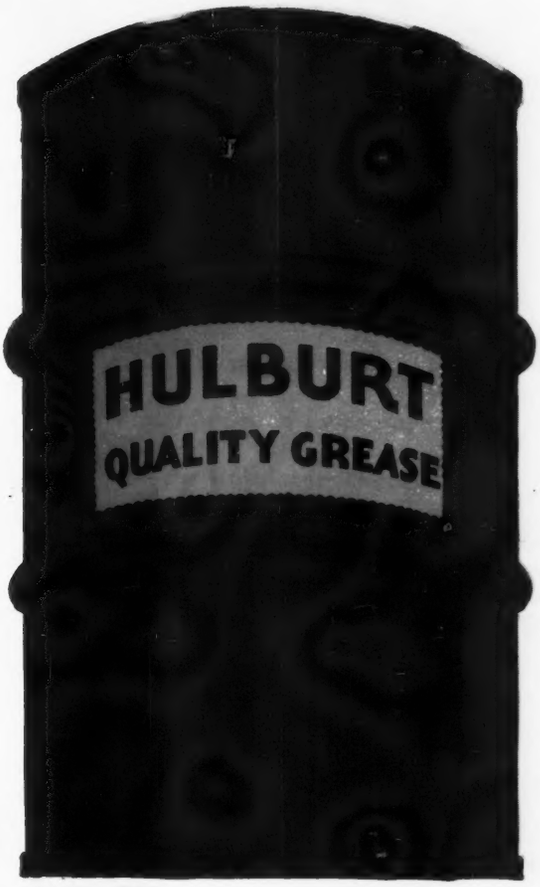
Coal operators who want to get further and further away from lubrication trouble are using HULBURT QUALITY GREASE increasingly year after year. Why? Because when this QUALITY product lubricates coal mining machinery, lubrication troubles decrease, machinery productivity increases. No mistake about it, nothing equals the performance of HULBURT QUALITY GREASE, winter or summer, because it is specifically compounded for a specific job, and DOES IT beyond comparison! Hulburt Lubrication Engineers go down into your mine and advise on its use, if requested.

HULBURT OIL & GREASE COMPANY—PHILADELPHIA, PENNA.

Specialists in Coal Mine Lubrication

- for Coal Mine Lubrication

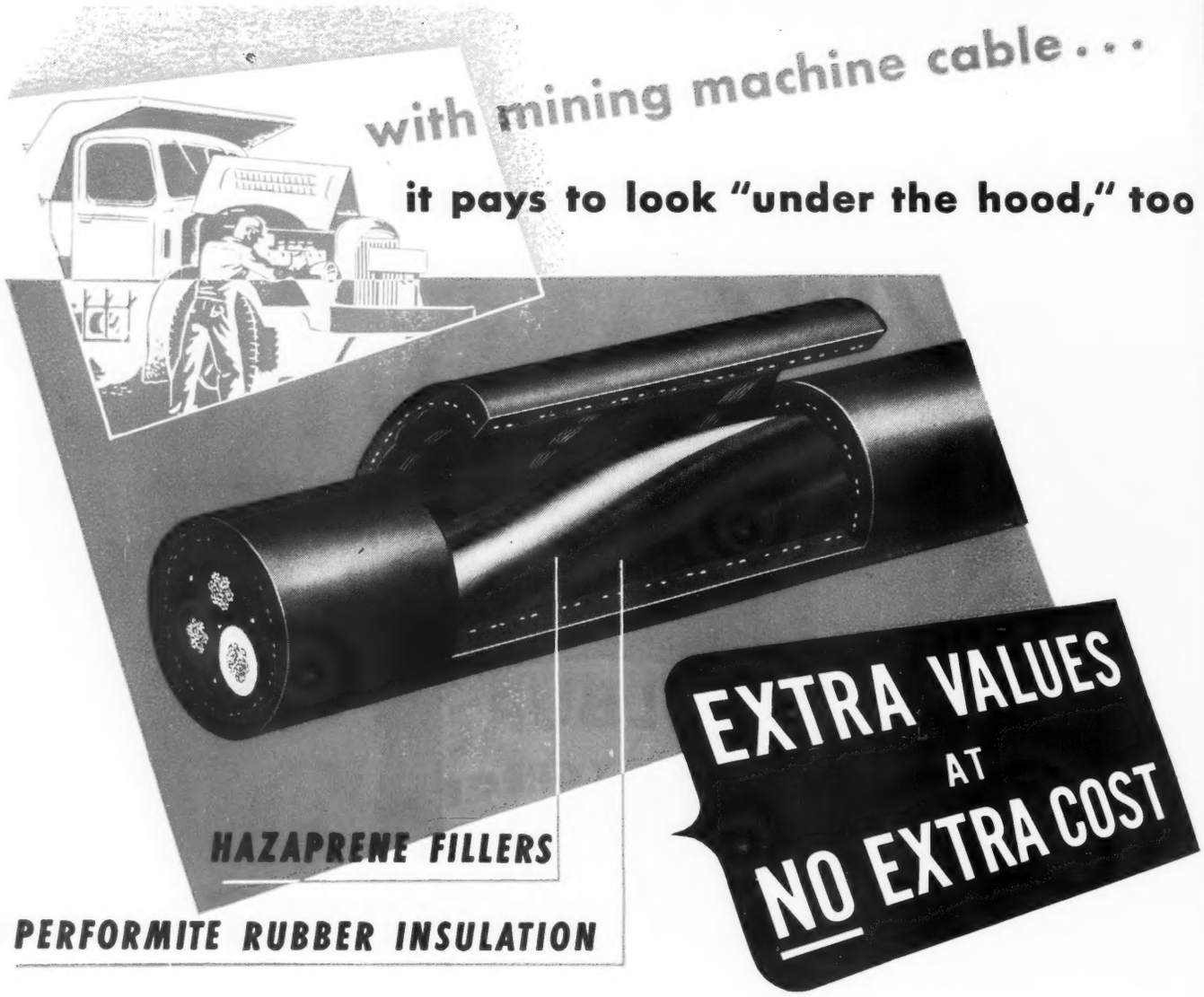
use



HULBURT

Quality GREASE

PROVEN BY PERFORMANCE



Of course — the outside jacket of mining machine cables is of prime importance to long, trouble-free cable life. That's why we talk so much about the Hazaprene jacket — its flame resistance . . . sun, oil, water and acid resistance . . . the way it stands up so long in the toughest kind of service.

But what about the conductor insulation? With Hazacord you get the *extra* protection and service life provided by *Performite* heat resisting rubber insulation. This better grade insulation permits Hazacord to safely carry approximately 25% more current than cables made with ordinary Performance grade rubber insulation. Performite insulation has a temperature rating of 75°C. as against a 60°C. rating for Performance grade insulation.

And consider fillers in cable construction. Jute fillers can sometimes act like a wick — drawing trouble-making moisture into the cable interior. So when fillers are necessary, Hazard puts only Hazaprene fillers into Hazacord mining machine cables. Again it's *extra* assurance for you, that with Hazacord carrying the load you have reduced the chances of trouble from this part of your job to a minimum. Get all the facts from the Hazard Mining Catalog. Hazard Insulated Wire Works, Division of The Okonite Company, Wilkes-Barre, Pa.

HAZARD

5260

insulated wires and cables for every mining use

Coal Age

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Haul bigger loads, in less time, with WALTER TRACTOR TRUCKS

IT'S the production pennies saved per ton, that make up your profit dollars when the year is over. Study your hauling methods for hidden profits! Duplicate the savings of other strip mine operators who have cut hauling costs from pit to plant, by using Walter Tractor Trucks.

These savings are due to the Walter 4-Point Positive Drive, which fully utilizes the enormous engine power and maintains 100% traction on stiffest grades, soft dirt, mud, ruts, ice and snow.

As a result, you get more tonnage per haul (up to 60 tons); more hauls per day; lower cost of operation; less lost time and expense for repairs and down time; longer truck life due to correct engineering and rugged construction. Investigate the economies of Walter Tractor Trucks for your mine. Write for detailed literature.

A FEW WALTER FEATURES

4-Point Positive Drive with 100% traction in all wheels.

Three Automatic Lock Differentials which proportion torque to four driving wheels, as needed.

Suspended Double Reduction Drive for higher ground clearance, more delivered power.

Tractor Type Transmission, 6 forward speeds, 2 reverse speeds, single control lever.

WALTER MOTOR TRUCK CO. 1001-19 Irving Ave., Ridgewood 27, Queens, L. I., N. Y.

WHAT THIS MACHINE DOES IS IMPORTANT TO EVERY OPERATOR WHO PROCESSES FINE COAL

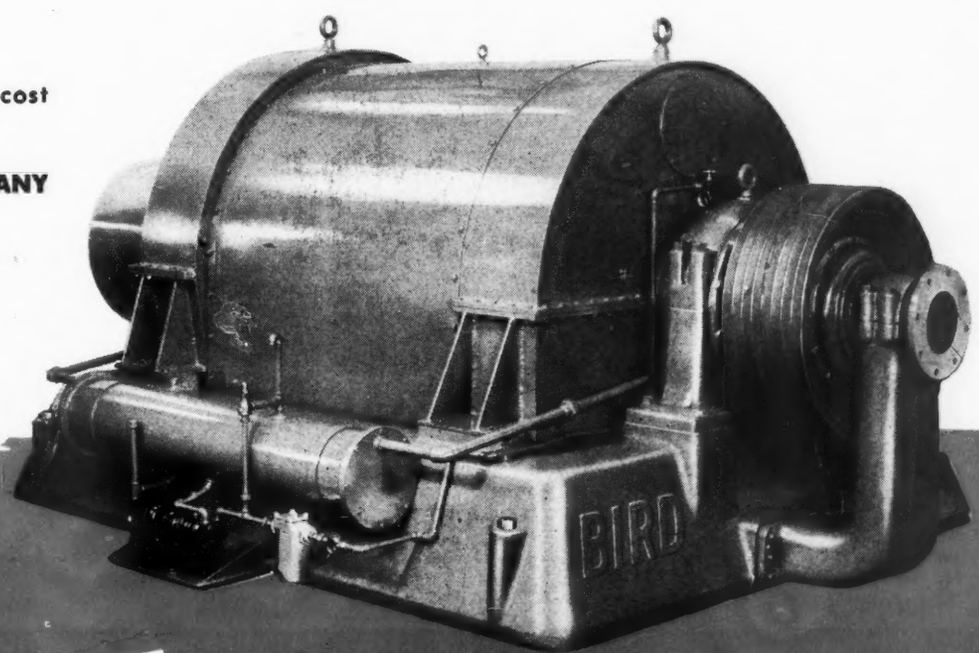
This is a BIRD Continuous Centrifugal Filter, the same machine that has been operating so successfully for hundreds of producers of minerals and chemicals for many years.

It takes the water out of fine coal after it has been washed. The fines are dry, ready for blending with the larger sizes; the water is clean, so that it can be used again and again.

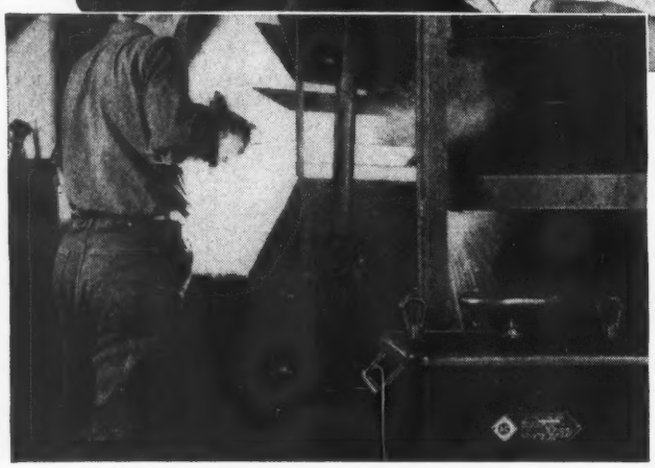
The BIRD handles big tonnage over long periods without parts replacements.

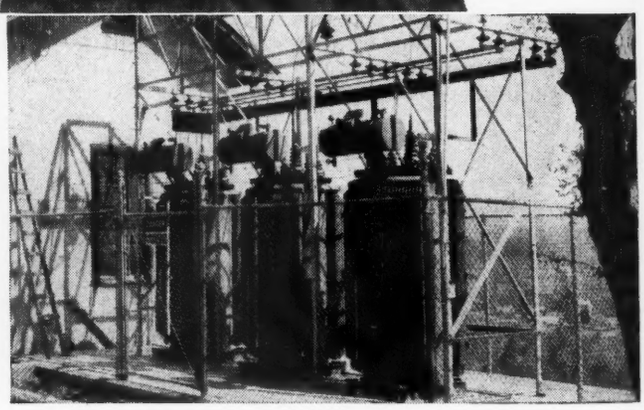
For performance and cost information, write

BIRD MACHINE COMPANY
South Walpole
Massachusetts



The BIRD Centrifugal FILTER





AUXILIARY EQUIPMENT

THE AMPAC 200 WELDER is a handy, dollar-saving investment for miscellaneous repair work in mine or preparation plant. Magic arc control eliminates weaving flame at high current settings. Ampac is easily adjustable . . . automatically selects the best striking voltage at any amperage setting, with the simple turn of amperage selecting wheel. And Ampac *cuts power costs!* Air gap flux energy is put back to work by means of a reactor coil. Sizes 200 and 400 amp for maintenance work. **BULLETIN B6241B.**

POWER DISTRIBUTION

THESE THREE ALLIS-CHALMERS TRANSFORMERS are designed to meet exacting requirements for mining service . . . step down voltages to 2,400 and 480 volts for primary and secondary power requirements. Allis-Chalmers builds *all* types of distribution and power transformers for *any* requirement — indoor or outdoor installations — oil or Chlorextol non-inflammable liquid filled . . . designed in accordance with ASA and NEMA standards. Find out about design and construction features. Send for **BULLETIN B6168.**

ALLIS-CHALMERS

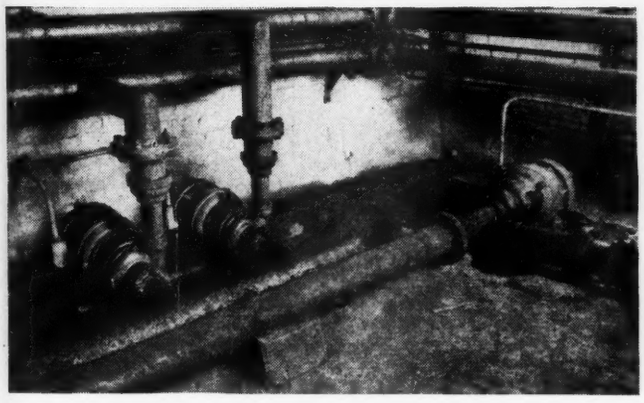
One of the Big 3 in Electric Power Equipment — Biggest of All in Range of Industrial Products

WHAT DO YOU MEAN . . Two Kinds of Equipment Costs?"

CONSIDER NOT ONLY "How much will it cost?" but also "How much will it cost *if we don't buy it?*" when you plan ahead in coal. Chances are you'll find that "getting by" with half-worn or obsolete equipment will prove more costly than equipment modernization. That's why — in terms of operating efficiency, maintenance costs and pay-off time — new equipment is a sound investment.

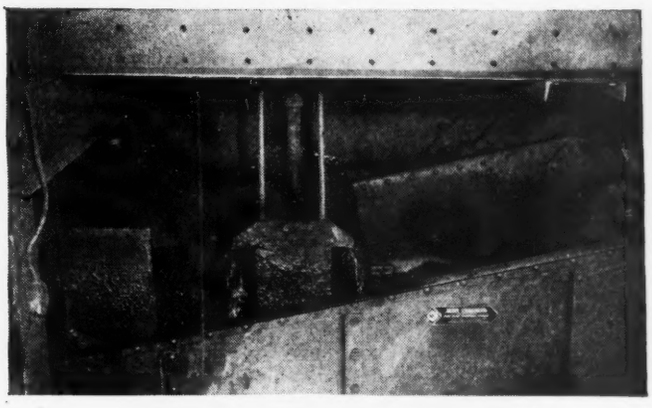
This is particularly true when you specify Allis-Chalmers coal processing and power equipment. Job records offer innumerable instances of Allis-Chalmers equipment lowering coal preparation costs . . . providing less troublesome maintenance . . . staying on the job longer despite severe service. Such performance records are the result of years of *unexcelled* experience in building processing equipment in a maximum range of types and sizes.

Plan now to strengthen your position for tomorrow's competition. Contact the A-C office near you. ALLIS-CHALMERS, MILWAUKEE 1, WIS.



CENTRIFUGAL PUMPS

COMPACT SS-UNIT PUMPS, two 300 and one 600 gpm, used in connection with air purification in coal mine. These versatile Allis-Chalmers pumps handle either mine water or preparation plant water . . . internal parts are made of corrosion-resistant materials. Both motor and pump are one unit. Available with standard, enclosed fan-cooled, splash-proof, or explosion-proof Allis-Chalmers squirrel-cage motors. Capacities 10 to 2,500 gpm; heads to 575 ft. Two-stage pumps for high head pumping. **BULLETIN B6059C.**



BASIC PROCESSING

WIDE APPLICATION RANGE of the Low-Head Vibrating Screen is the result of two distinct types of screen decks. The End-Tensioned Deck, shown above, is used for sludge dewatering and fine screening down to 35 mesh. Conveying action of screen in combination with deck construction results in increased wet screening and dewatering efficiency. The conventional side tensioned deck is used for screening and dewatering larger size coal. Low-Head sizes range from 3 by 6 to 6 by 16 ft. Send for **BULLETIN B6330.**

A 2198

1847 1947 A CENTURY OF SERVICE to Industry THAT MADE America Great

. . . builds for COAL

MAKES MORE $ FOR MORE MINES

than any other kind

The largest selling bits for use with mechanical coal cutting machines are Bowdil Bits. Such popularity is deserved by performance, long life and low cost operation in a growing list of mines throughout the world.

Made of special alloy steel and heat treated by the most modern methods to hardnesses best suited to your cutting conditions, Bowdil Bits are available in special shapes, cutting face contours and clearance angles to fit your needs.

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BOWDIL
COAL CUTTING EQUIPMENT
CANTON OHIO

PICK YOUR CHAMP

for rock work

ONE of these job-proved Goodyears is the "right" tire for *your* haul — designed to cut *your* rock work costs to bedrock.

The big boss is the Hard Rock Lug. For straight off-the-road duty in quarries and strip mines, it's the toughest thing on wheels—so proved by years of standout service. But where your haul is off AND on the road, the new double-duty Road Lug is your cost-cutting tire.

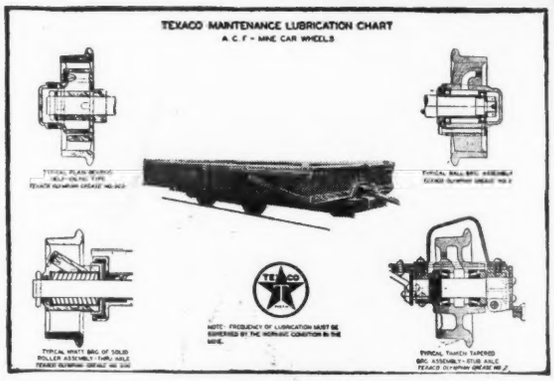
Both these companion tires are true champs — teamed up to lick *any* rock work. Both are built with extra-strong rayon cord and extra-heavy treads. Each works on a specially-designed tread tailored to its job. And both add up to the lowest-cost ton delivery Goodyear has ever offered the industry. It will pay off big to find out which one best meets *your* requirements.

GOODYEAR

Road Lug—T.M. The Goodyear Tire & Rubber Company

MORE TONS ARE HAULED ON GOODYEAR TRUCK TIRES THAN ON ANY OTHER KIND

THIS GREASE HELPS MOVE MORE TONNAGE



FREE — TEXACO MAINTENANCE LUBRICATION CHARTS: Leading manufacturers of underground coal mining machinery approve Texaco products for use on cutters, loaders, locomotives, etc., and have cooperated in preparing these charts. Charts show clearly where and when to use the proper Texaco lubricant. Write for the charts you need, stating make and model of each machine. No obligations.

Tune in . . .
TEXACO STAR THEATRE
presents the
TONY MARTIN SHOW
every Sunday night.
See newspaper for
time and station.

TEXACO
REG. T. M.

TEXACO LUBRICANTS

DO AS THE men in the picture are doing — lubricate car wheels with *Texaco Olympian Grease.* In plain, cavity hub or anti-friction bearings, *Olympian* assures easier starts and smoother operation even at winter temperatures, thus enabling locomotives to handle trains more easily, move more tonnage on every shift.

Texaco Olympian Grease is made especially for mine service — in three easy-to-apply consistencies. It has exceptional resistance to oxidation, separation and leakage . . . it is not affected in service by moisture or low temperatures. For longer bearing life and lower maintenance costs, use *Olympian.*

Use *Olympian Grease* also on cutters, loaders and similar equipment. You'll get the same effective protection and savings in maintenance costs.

For Texaco Products and Lubrication Engineering Service, call the nearest of the more than 2500 Texaco Distributing Plants in the 48 States, or write:

The Texas Company, *National Sales Division, Dept. C,* 135 East 42nd Street, New York 17, N. Y.

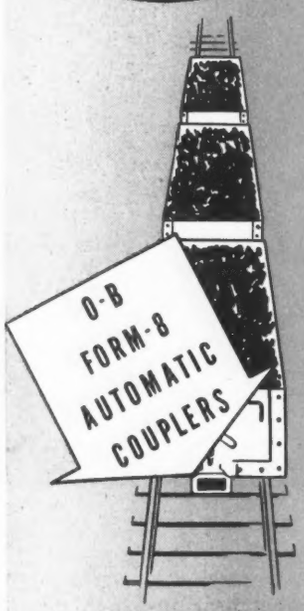
For the Coal Mining Industry

3 Reasons why O-B Form-8 Automatic Couplers give your Mine Cars added Track Stability

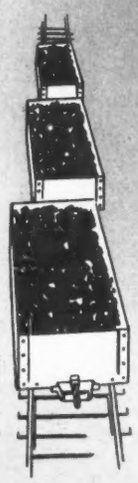
With the present trend to larger and heavier mine cars, track stability becomes an increasingly important consideration. Whereas older cars were usually light and easily placed back on the track, large, all-steel cars require considerable time and effort to re-rail after derailments. Faster operating speeds and heavier loads multiply the damaging impact of two cars banging together.

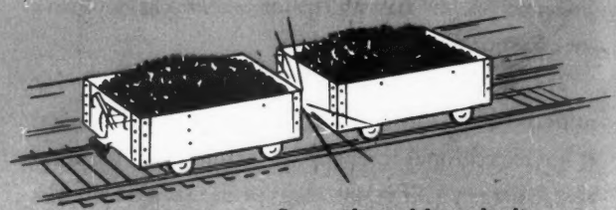
O-B Form-8 Automatic Couplers bring increased track stability to your mine cars in three important ways. First, cars are kept in center-to-center alignment under push or buff, lessening the chance for derailment. Second, since cars do not zigzag, car wheels do not tend to ride the rail, thus preventing excessive scrubbing and wheel wear. Third, Form-8 Couplers provide a cushiony rubber draft gear which will absorb impact blows up to 100,000 pounds — eight times the normal limit of ordinary steel springs.

If you want to get the most out of your haulage equipment, don't fail to take track stability into your consideration. Make certain your new cars are provided with this feature by insisting that they be equipped with O-B Form-8 Automatic Couplers. Write for free booklet 813-AM giving more complete information.

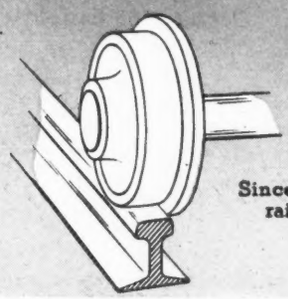


Instead of zigzagging under push or buff... Mine cars stay on the track in center-to-center alignment.

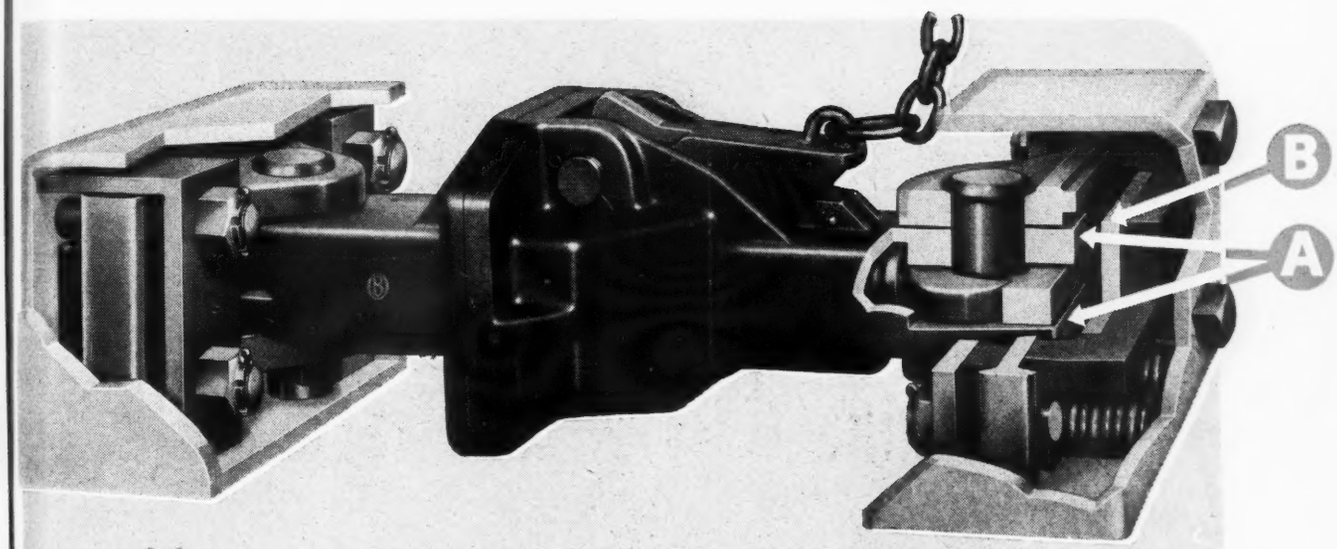




A sturdy rubber draft gear absorbs impact blows up to 100,000 lbs.



Since car wheels do not tend to ride the rail, wheel flange wear is lessened.



How the Form-8 Coupler works

to keep your mine cars on the track

A glance at the above cut-away picture tells the reason why O-B Couplers provide greater track stability. Cars equipped with links and pins or ordinary couplers push against each other through a single pivot point. Because of its tolerance between tread and track gauge, a car tends to zigzag. Pushing through a single pivot point magnifies this tendency, producing against the wheels a side thrust to derail. Notice the thickened ends of the O-B drawbar casting (A above). Notice also the steel plate (B) embedded directly behind in the rubber buffing pad. Under pull or light buffing pressure, a slight spacing between these two parts permits the drawbar casting to pivot about the clevis pin. Above 3000 pounds buff, the wide drawbar ends bear against the steel plate. This straightens the coupler bodies and holds the mine cars in center-to-center alignment.

Ohio Brass

MANSFIELD, OHIO

Canadian Ohio Brass Co., Ltd., Niagara Falls, Ontario

2760-AM

Cold Facts...

...ON LUBRICANT PERFORMANCE

This special refrigerating apparatus at Sinclair Laboratories tells an important story every day to research experts and refinery control technicians.

The thermometers, shown above inserted in lubricating oil samples, record temperature as cold is increased in the special refrigerating apparatus. Trained observers check the samples frequently, test for pour point. Sinclair, thus, makes sure that its lubricants retain full protective qualities even at sub-zero temperatures . . . when your specific application demands.

Such constant manufacturing control and research assures you that famous Sinclair lubricants . . . and all new Sinclair products . . . will give outstanding performance to meet your most exacting requirements.

Sinclair Lubricants for Above-Ground Equipment

For Turbines:
SINTURLITE OILS
For Steam Cylinders:
SINCLAIR STEAM CYLINDER AND VALVE OILS
For Compressors:
RUBILENE OILS
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BEARING GREASE AF

SINCLAIR REFINING COMPANY • 630 FIFTH AVENUE, NEW YORK 20, N. Y.

SINCLAIR

Lubricants for Industry

FINEST CRUDES + EXPERT RESEARCH and MANUFACTURING CONTROL = OUTSTANDING PERFORMANCE

SAVES PRODUCTION TIME!

JOY TIMBER SETTER

Safe...Easily Operated

LIFTS TIMBERS TO 7'8"

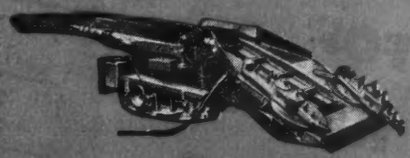
Hydraulically operated boom has swing of 50° to right or left of center. Timbers lift straight up on free, full swiveling platform for safe, accurate positioning. Second jack, which can be lowered to mine floor, provides solid prop from bottom to roof. Carries enough timbers to serve ordinary shift. Joy's new, automatic, hydraulic cable reel is standard equipment. Overall height of machine only 35".

Built-in Timber Saw is fully protected

Timbers can be cut to exact sizes at point of work. Saw is hydraulically operated, returning to protective shield immediately upon release of handle.

Consult a Joy Engineer

JOY LOADERS MOVE TONNAGE FASTE



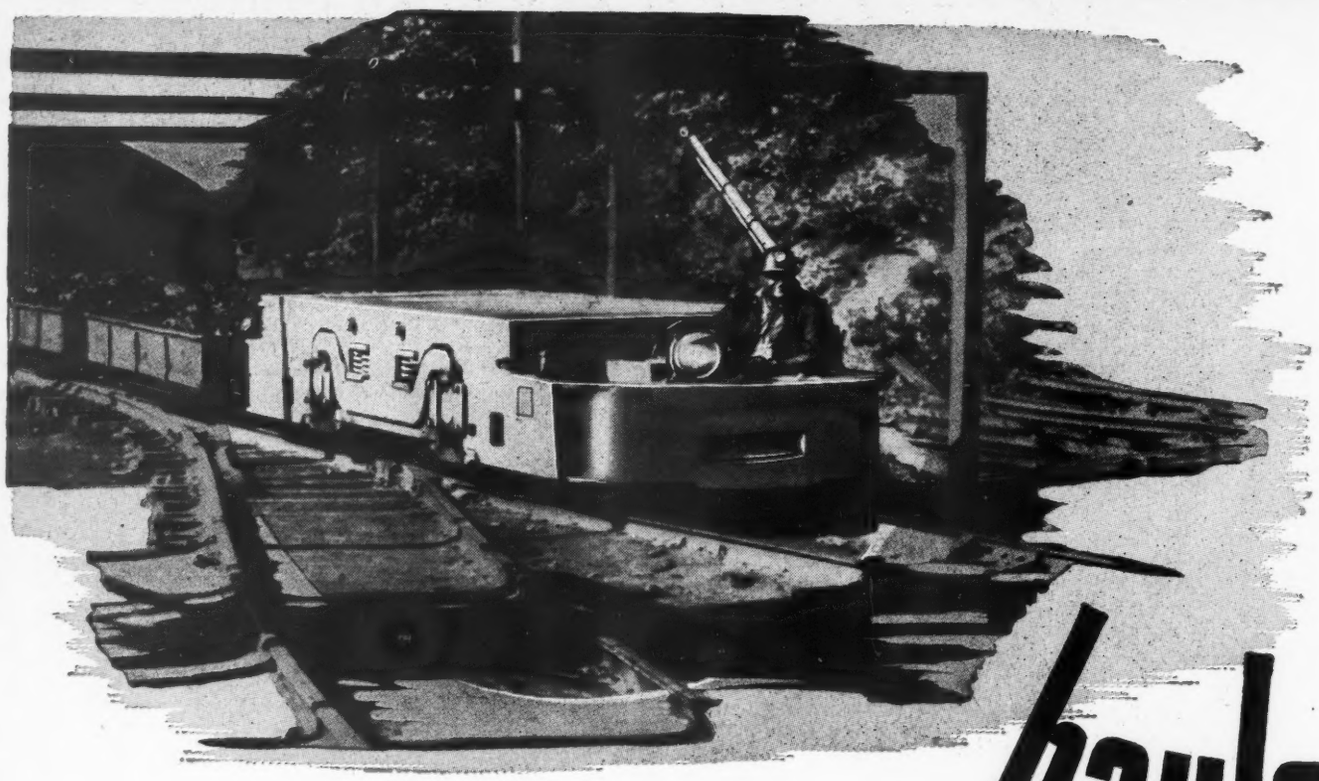
Models for all seam heights and mining systems

W&O CL 1225

JOY DIVISION

JOY MANUFACTURING CO.

GENERAL OFFICES: HENRY W. OLIVER BLDG., PITTSBURGH, PA.



hauls

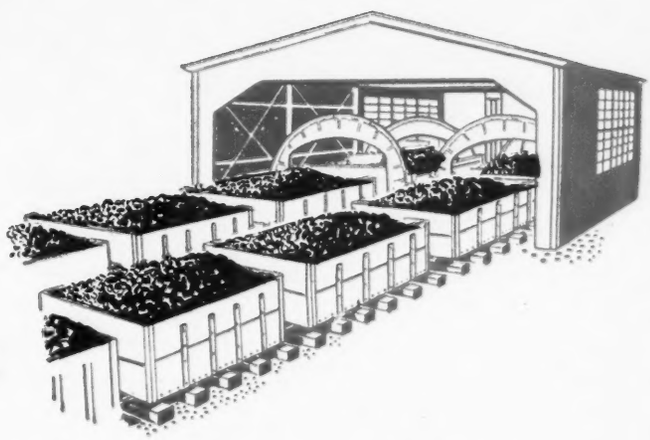
...helps you meet

HOW'S THIS FOR HAULING POWER

LOCOMOTIVE				WEIGHT OF TRAILING TRAIN IN TONS (2000 lbs.)						
				Grades						
Weight Tons (2000 lbs.)	No. of Motors	Rated Draw-bar Pull (Level Track)	M.P.H. at Rated Drawbar Pull	Level	1%	2%	3%	4%	5%	6%
10 10	2 2	5000 lbs 5000 lbs	9.0 11.5	167	96	66	49	38	31	25
13 13	2 2	6500 lbs 6500 lbs	8.5 10.5	217	125	86	64	49	40	32
15 15	2 2	7500 lbs 7500 lbs	8.0 10.0	250	144	99	73	57	46	37
20 20	2 2	10000 lbs 10000 lbs	9.0 10.5	334	192	132	98	76	62	50
25 25	3 3	12500 lbs 12500 lbs	9.5 11.0	418	240	165	122	95	77	62
30 30	3 3	15000 lbs 15000 lbs	9.0 10.5	500	288	198	147	114	93	75

The weights of trailing train shown in this table are calculated using 30 pounds per ton for car and track friction and 20 pounds per ton for each per cent of grade. Locomotives may be obtained in either of the two speeds listed above

bigger loads faster...



tighter schedules

Trolley-Type Mine-Haulage Locomotives

If high production demands have put the pressure on your hauling operations, there's only one way to beat the problem. Haul more coal per trip and haul it faster! That's a job for G-E trolley-type mine-haulage locomotives. Because they're conservatively rated and equipped with force-ventilated traction motors, they withstand the heaviest-duty work cycles. Power is applied smoothly. This enables you to operate these units close to the wheels' slipping point even with heavy loads.

GOOD "TRACKING" MEANS FASTER TRIPS

G-E locomotives are built to hold the rails at high speeds. They're suspended on coil springs that minimize "bobbing" and track pounding. Thus, the operator can maintain higher running speeds at crossovers, turnouts, curves and on the straightaway. These locomotives are easier to operate, too. Control manipulation requires little physical effort or manual dexterity. And—they run for long periods between overhauls. We've prepared an illustrated bulletin describing these locomotives. Write today for Bulletin GEA-4676. *Apparatus Dept., General Electric Company, Schenectady 5, N. Y.*

STRONG ON PERFORMANCE—EASY ON SERVICE!

Smooth-riding Chassis Frame is all-welded and insulated from road jolts and jars by coil springs. Hard-wearing wheels ride on roller bearings. Dirt is sealed out of journal boxes.

Hard-working Motors Frames are one-piece steel castings. Windings are made with rectangular conductors to minimize power losses and heating. Heat-treated gearing resists wear for long periods.

Long-lived Controls Power-operated contactors open and close quickly. Arc is short—contactor tips last longer. All wire is neatly arranged, securely clamped and protected against physical damage.

GENERAL ELECTRIC

687-64

How to cut Haulage Cost

. . . per Year

. . . per Mile

. . . per Ton

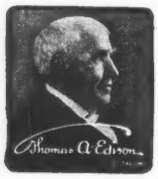
!

Use of EDISON Nickel-Iron-Alkaline Batteries in battery-operated locomotives and shuttle cars will help cut your haulage costs in several ways.

Perhaps most important, their unequaled dependability gives the closest approach to failure-free uninterrupted haulage it is possible to obtain. This is due partly to their steel cell construction which withstands rough usage, partly to their alkaline electrolyte which is a preservative of steel, and partly to their electrochemical principle of operation which is free from self-destructive reactions.

They do not require critical adjustment of charge rates, hence can be charged direct from the d-c power supply through relatively inexpensive resistors without need of motor-generators. They can be fully recharged in 6 to 7 hours and require no equalizing which helps get all charging done during off-peak periods.

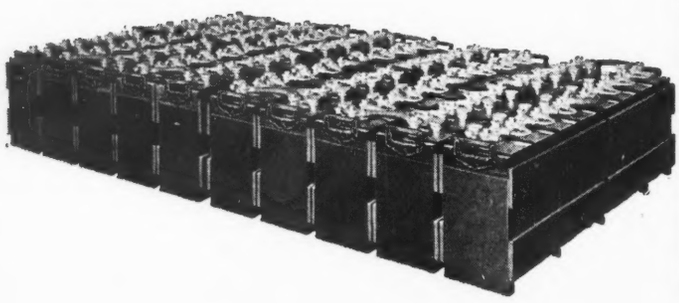
Finally, they give much longer service life than other types of batteries. *Edison Storage Battery Division of Thomas A. Edison, Incorporated, West Orange, New Jersey.* In Canada: *International Equipment Company, Limited, Montreal and Toronto.*



EDISON

Nickel • Iron • Alkaline

STORAGE BATTERIES



In Mine Locomotive and Shuttle Cars EDISON Nickel-Iron-Alkaline Batteries Give You These Important Advantages

★ They are **durable mechanically;** grids, containers and other structural parts of the cells are of steel; the alkaline electrolyte is a preservative of steel.

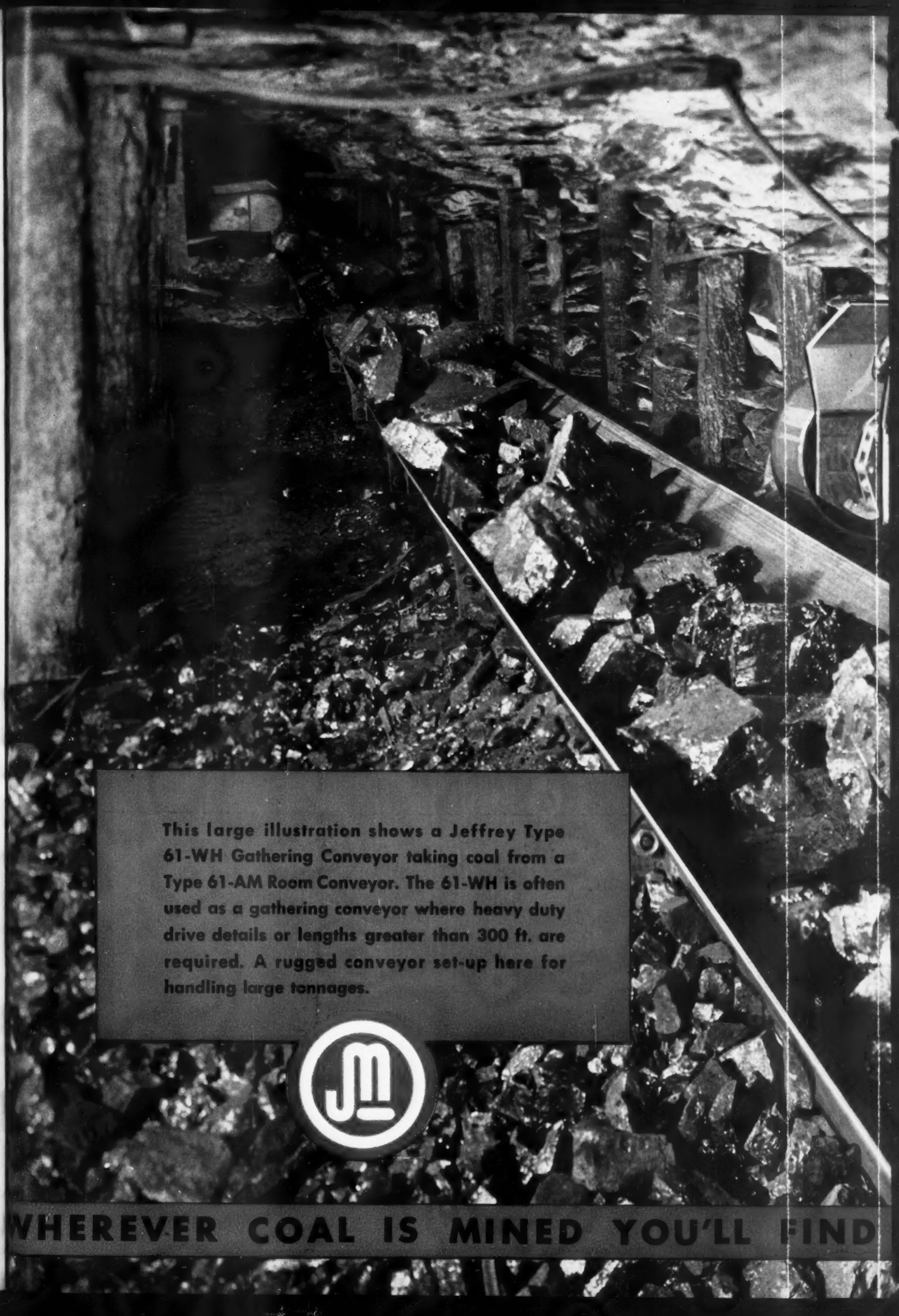
★ They are **foolproof electrically;** are not injured by short-circuiting, reverse charging or similar accidents; are free from self-deteriorating reactions.

★ They can be **charged rapidly;** do not require critical adjustment of charge rates; can be charged directly from mine d-c supply.

★ They **withstand temperature extremes;** are free from freezing hazard; are easily ventilated for rapid cooling.

★ They can **stand idle indefinitely** without injury, without attention, and without expense.

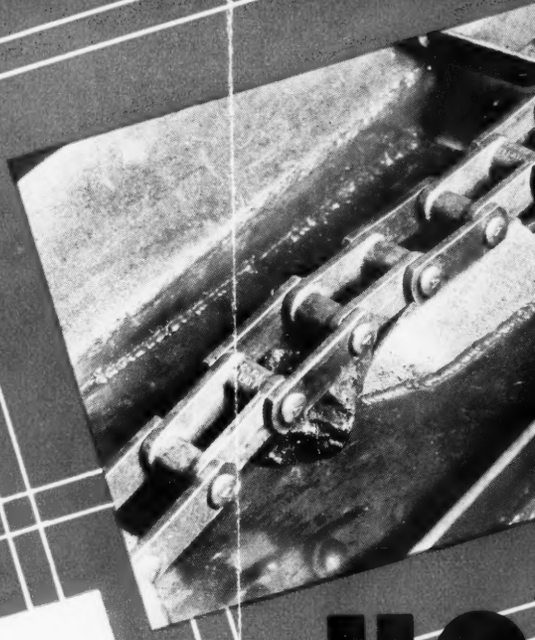
★ They are **simple and easy to maintain.**

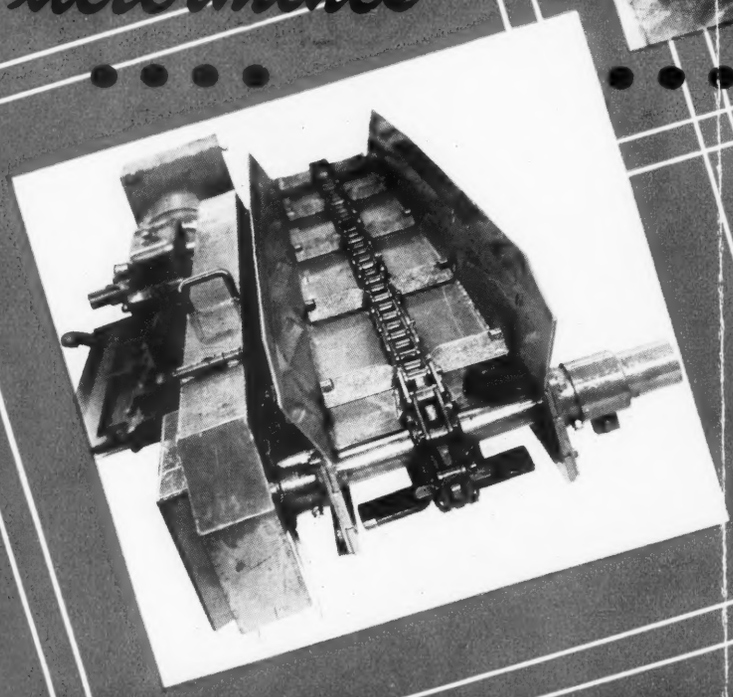

This large illustration shows a Jeffrey Type 61-WH Gathering Conveyor taking coal from a Type 61-AM Room Conveyor. The 61-WH is often used as a gathering conveyor where heavy duty drive details or lengths greater than 300 ft. are required. A rugged conveyor set-up here for handling large tonnages.
WHEREVER COAL IS MINED YOU'LL FIND

D YOU'LL FIND SOME TYP

TYPE OF JEFFREY EQUIPMENT

HOW *they're* BUILT *determines* ....





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JEFFREY UNDERGROUND CONV

Here we illustrate a few of the outstanding points in the design and cons of Jeffrey Chain Conveyors. For example, the photo (top-left) shows th tages of the patented diverging head which greatly reduces lump break eliminates possibility of bending flights when passing over head sprock is accomplished by the downward slope of the bottom plate, providin clearance between it and the flight at the sprocket. Thus any slate or co has worked under a flight will be discharged freely from this divergi

The photo (top-right) illustrates the plow—a patented Jeffrey deve consisting of a plow-shaped angle welded to the bottom pan in front sprocket—lumps working under the chain are diverted to either side. N that extended shafts, drive chains, etc. are protected by suitable

Another advantage is the flexibility of the power unit which permi to be applied from either side. Both the Head End and Power U individual assemblies held together by a connecting rod and mount leveling base which facilitates movement of conveyor from room t

Jeffrey Underground Conveyors are available in Room, Face, Gathe Elevating types to meet all operating conditions.

JEFFREY FOR COA

Jeffrey service to Coal Min

CUTTERS

BLOWERS

FANS

HOW THEY SERVE

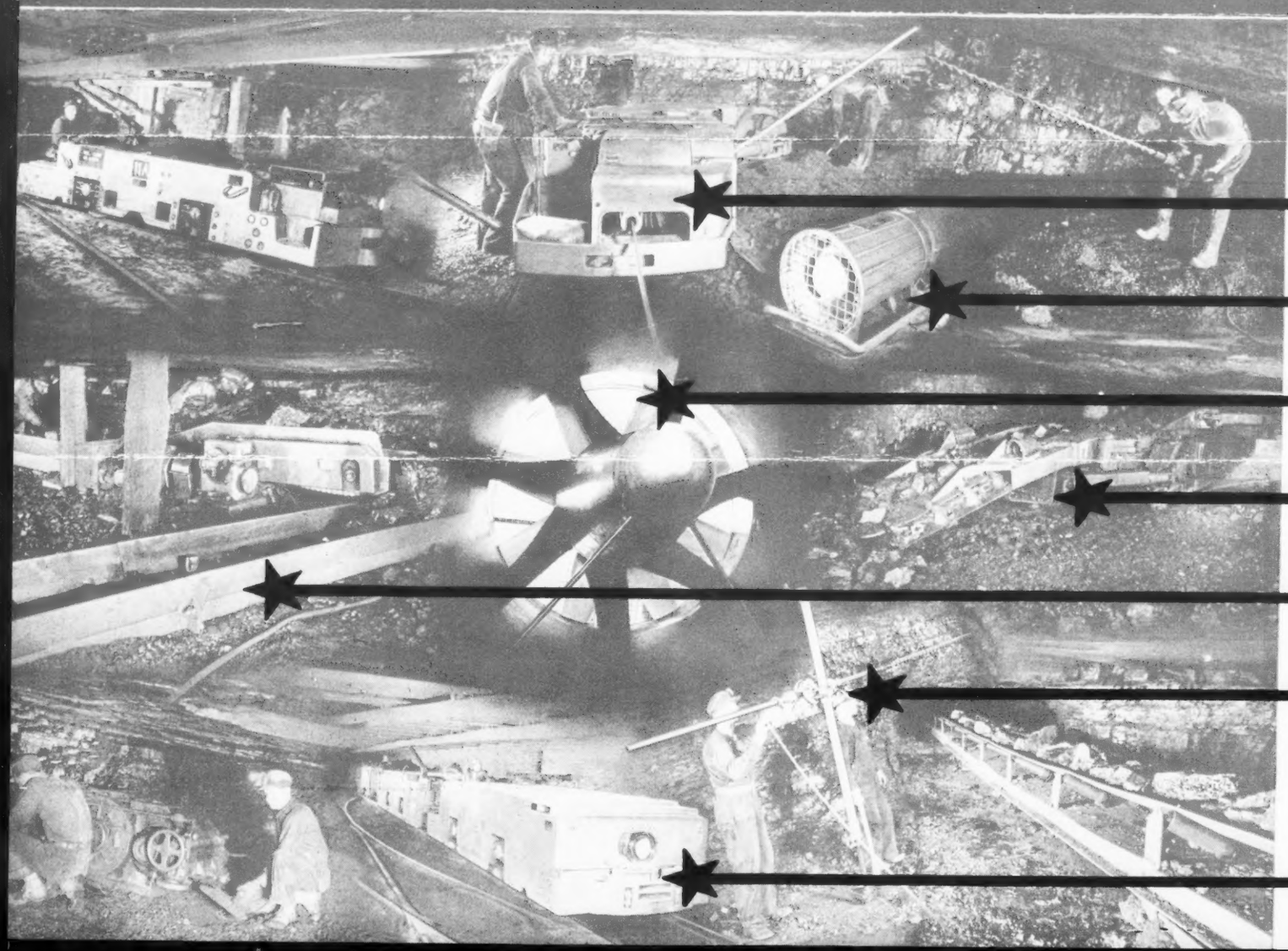
CONVEYORS

gn and construction
ft) shows the advan-
lump breakage and
head sprocket. This
te, providing ample
y slate or coal which
this diverging head.

Jeffrey development
pan in front of head
either side. Note also
by suitable guards.

hich permits power
d Power Unit are
and mounted on a
rom room to room.

Face, Gathering and



JEFFREY EQUIPMENT FOR COAL MINES

Jeffrey service to Coal Mines means service to all industry

- CUTTERS
- BLOWERS
- FANS
- LOADERS
- CONVEYORS
- DRILLS AND DRILLING MACHINES
- LOCOMOTIVES

THE JEFFREY MANUFACTURING COMPANY

ESTABLISHED IN 1877

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FOREIGN PLANTS:

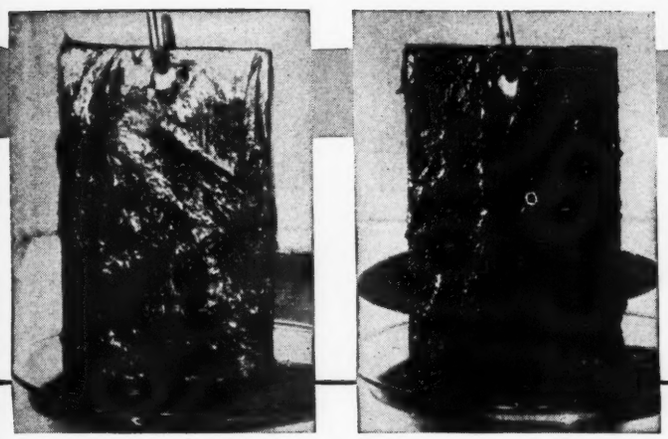
Jeffrey Mfg. Company, Ltd. Montreal, Quebec

British Jeffrey-Diamond, Ltd. Wakefield, England

Jeffrey-Galion (Pty), Ltd. Johannesburg, S. A.

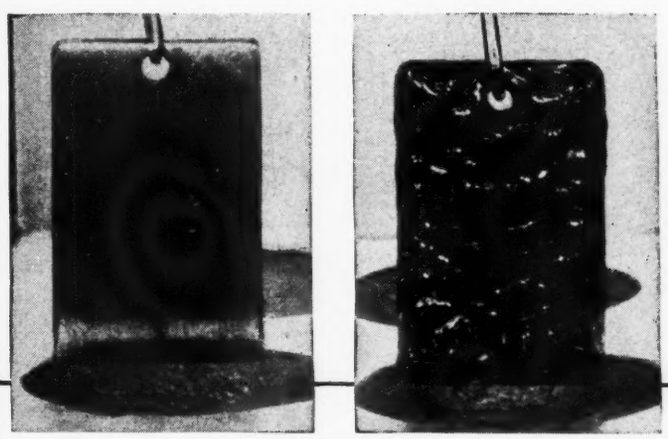
Where mine equipment needs water-resistant lubrication use....

CALUMET Viscous Lubricants



Test equipment for comparing water resistance of greases. Metal strips are coated with greases to be compared. Left strip—a conventional type soda soap grease. Right strip—a Calumet Viscous Lubricant.

The instrument dips the strips into beakers containing water at 80°F. at the rate of 30 times per minute for 20 hours.



The same test strips after the 20-hour test. The strip containing conventional type soda soap grease is practically bare. The strip holding Calumet Viscous Lubricant is still completely covered.

THE SIMPLE TEST described here shows how Calumet Viscous Lubricants reduce lubricant consumption and protect open gears and wire rope against wear, even though subjected to the direct washing action of water.

Calumet Viscous Lubricants give these advantages because they are compounded from selected soaps and oils of proper viscosities and contain a special additive which makes them adhere closely to metal. They do not require heating before application, and all but the heaviest grades can be sprayed. These application features offer direct savings in time and grease.

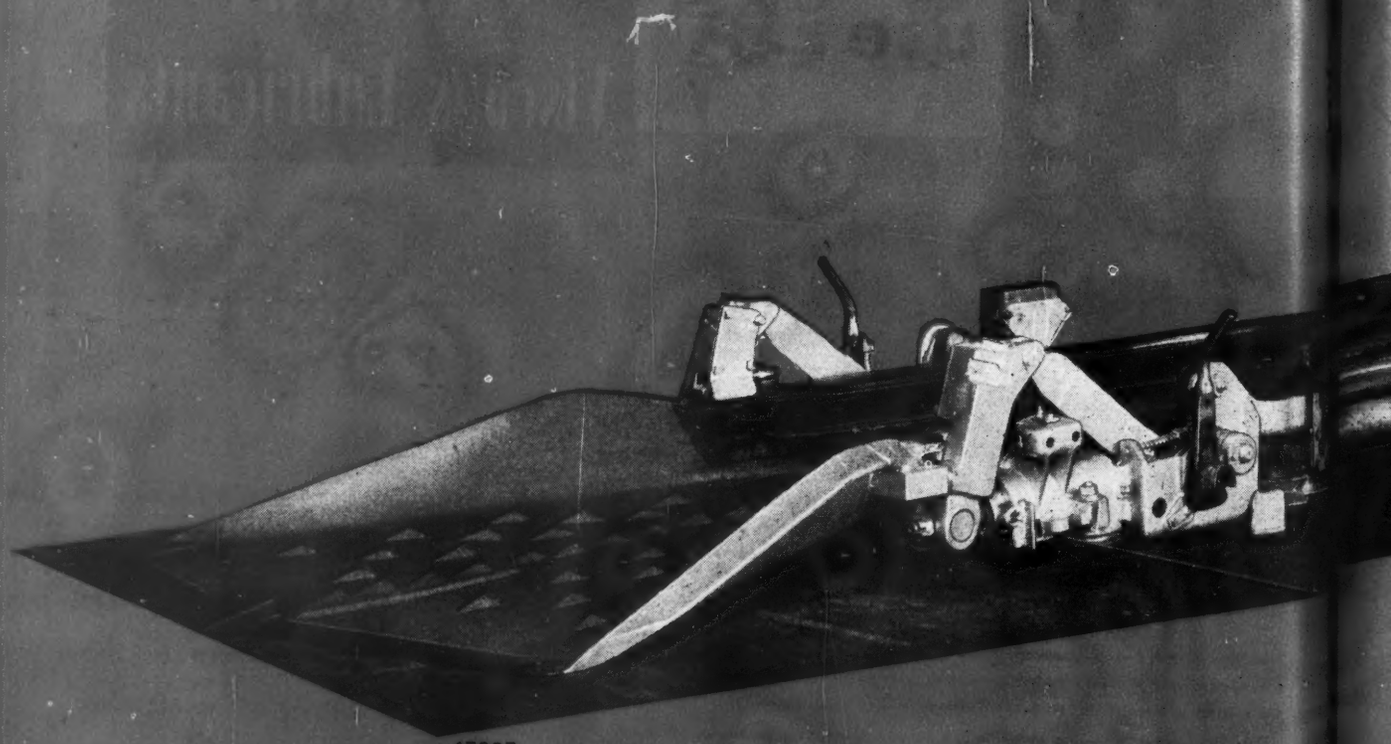
A Standard Oil Lubrication Engineer will help you select the grade you need for low cost lubrication on many mine applications.

Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.

STANDARD OIL COMPANY (INDIANA) STANDARD SERVICE

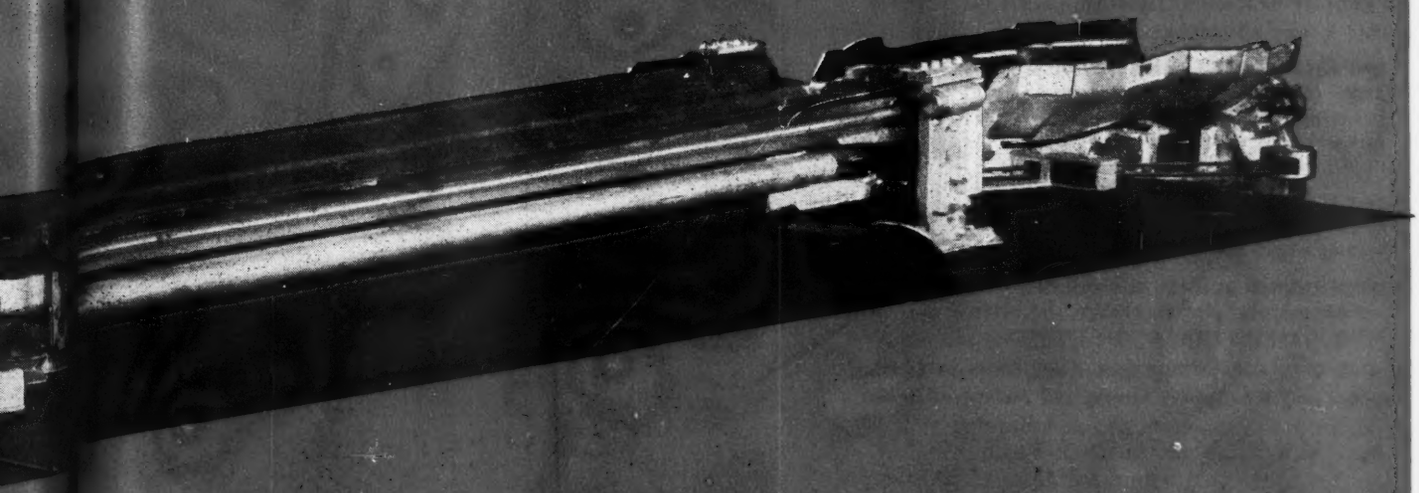
Boston Buffalo Cincinnati Detroit Houston Huntington Philadelphia Pittsburgh Salt Lake City Birmingham St. Louis Scranton Montreal, Quebec Jeffrey-Galion (Pty), Ltd. Johannesburg, S. A.

THE GOODMAN POWER DUCKBILL . . .



GOODMAN MANUFACTURING COMPANY

All Movements Power Controlled



. . . loads at the face and discharges into cars or onto belt at the room neck; there is no track in the room. With an 8 foot depth cut, 40 foot rooms can be advanced 300 feet in 6 days — double shift, in 3 to 4 days — triple shift.

By working the room out quickly a minimum of top trouble is experienced. Large tonnages are secured from concentrated areas.

HALSTED STREET AT 48TH • CHICAGO 9, ILLINOIS

For faster, better piping jobs get everything from CRANE

An all-Crane installation! That's a sure way to keep piping jobs moving swiftly and smoothly—from design to erection to maintenance. Crane quality throughout—in valves, fittings, pipe, accessories, and fabricated piping—makes dependable performance a foregone conclusion.

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SOURCE OF SUPPLY
RESPONSIBILITY
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ONE SOURCE OF SUPPLY offering the world's most complete selection of steel, iron, brass and alloy piping materials for all power, process, and general service applications.

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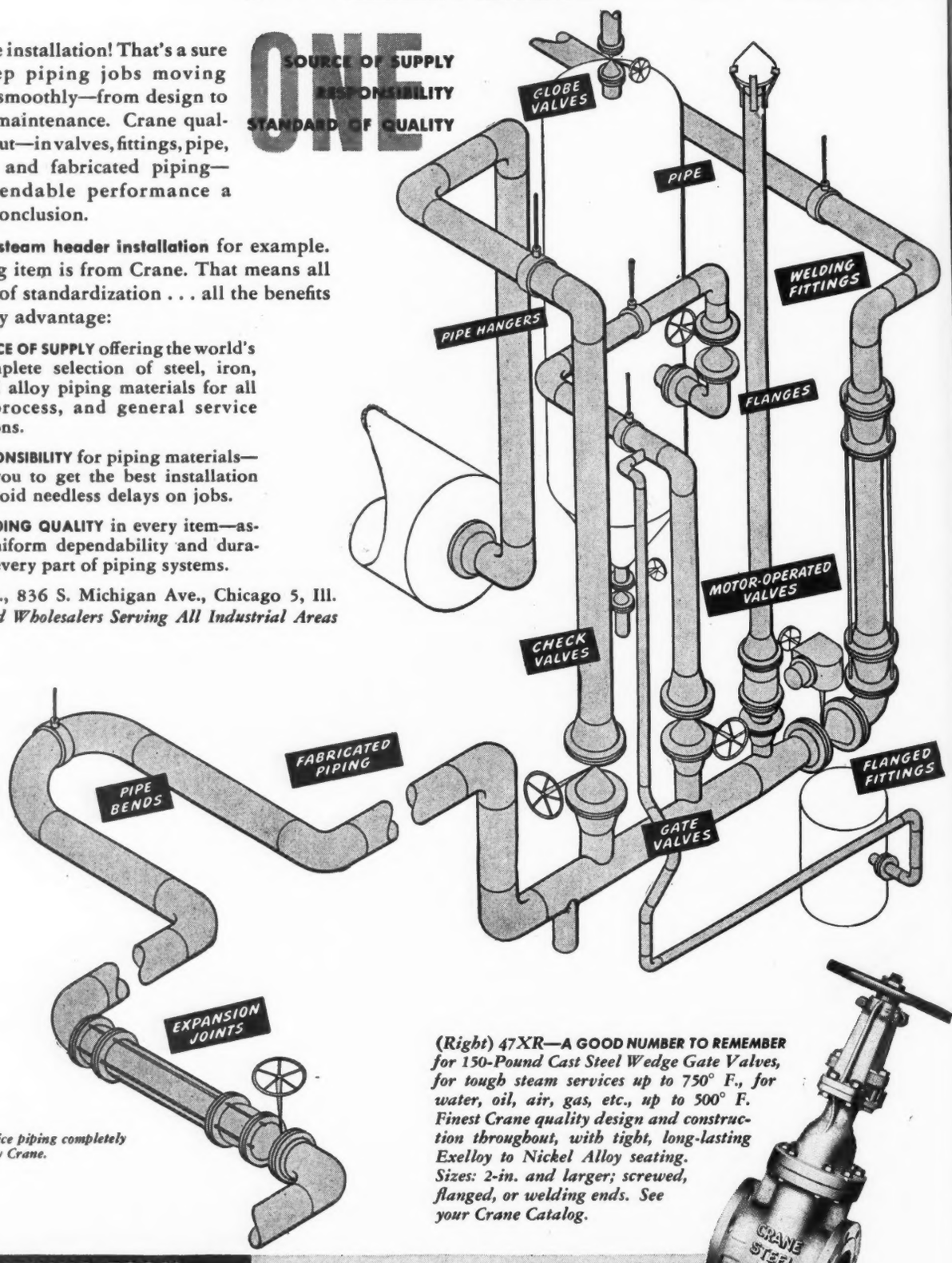
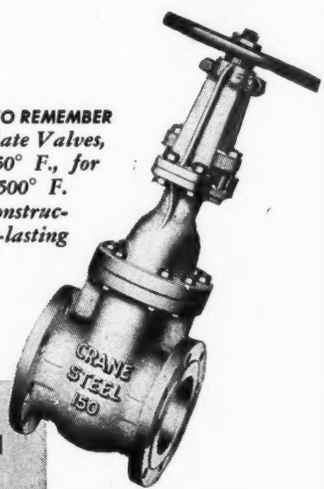


Steam service piping completely equipped by Crane.



(Right) 47XR—**A GOOD NUMBER TO REMEMBER** *for 150-Pound Cast Steel Wedge Gate Valves, for tough steam services up to 750° F., for water, oil, air, gas, etc., up to 500° F. Finest Crane quality design and construction throughout, with tight, long-lasting Exelloy to Nickel Alloy seating. Sizes: 2-in. and larger; screwed, flanged, or welding ends. See your Crane Catalog.*

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VALVES • FITTINGS
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FOR EVERY PIPING SYSTEM

For longer, better service from Rail Bonds

specify U·S·S AMERICAN

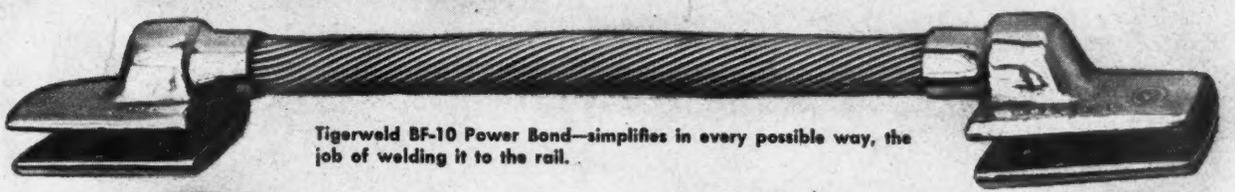
STURDY, U·S·S TIGERWELD Rail Bonds have proved their superiority on hundreds of miles of heavily traveled electrified mine track. They maintain constant low voltage . . . reduce power loss.

Because they have high resistance to vibratory stresses, they assure longer service and keep power flowing year in and year out.

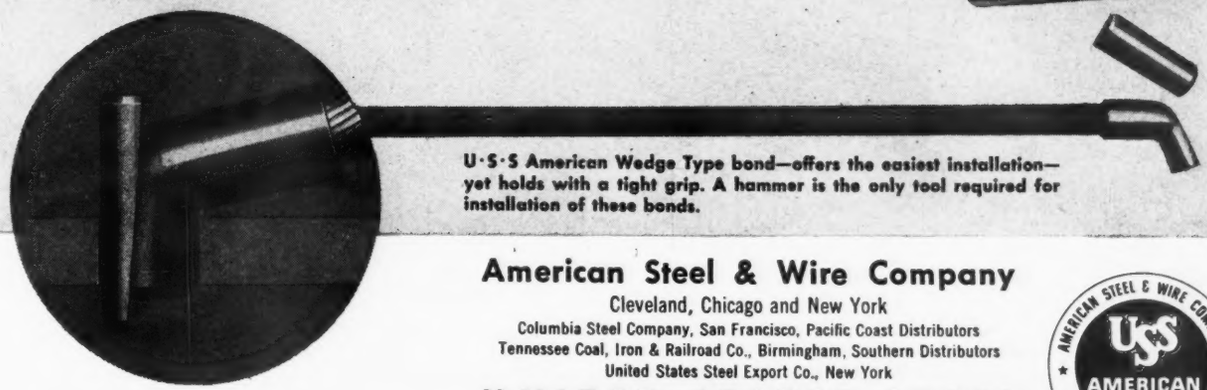
If your requirements are for bonds that permit quick, easy installation, we suggest BF-10 TIGERWELD Rail Bonds. They have a self-clamping feature that holds the bond in correct position for easy welding.

And for temporary or other trackage, where welded bonds are not necessary, the American Wedge Type bond can be installed and removed with a minimum of time and effort.

For complete information on all types of U·S·S TIGERWELD Rail Bonds, contact our sales office most convenient to you.



Tigerweld BF-10 Power Bond—simplifies in every possible way, the job of welding it to the rail.



U·S·S American Wedge Type bond—offers the easiest installation—yet holds with a tight grip. A hammer is the only tool required for installation of these bonds.

American Steel & Wire Company

Cleveland, Chicago and New York

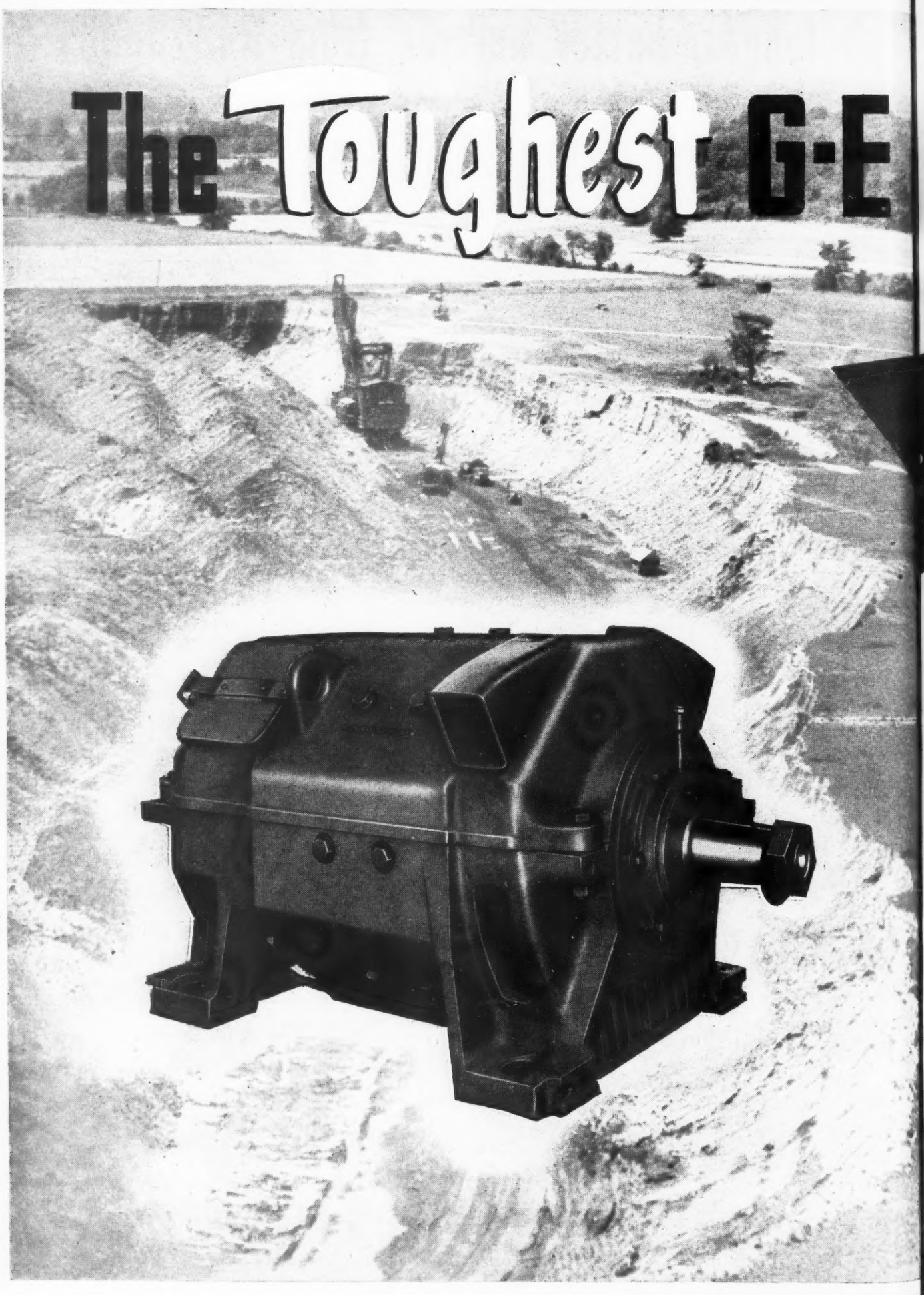
Columbia Steel Company, San Francisco, Pacific Coast Distributors
Tennessee Coal, Iron & Railroad Co., Birmingham, Southern Distributors
United States Steel Export Co., New York

UNITED STATES STEEL

AMERICAN STEEL & WIRE COMPANY · USS · AMERICAN RAIL BONDS · UNITED STATES STEEL

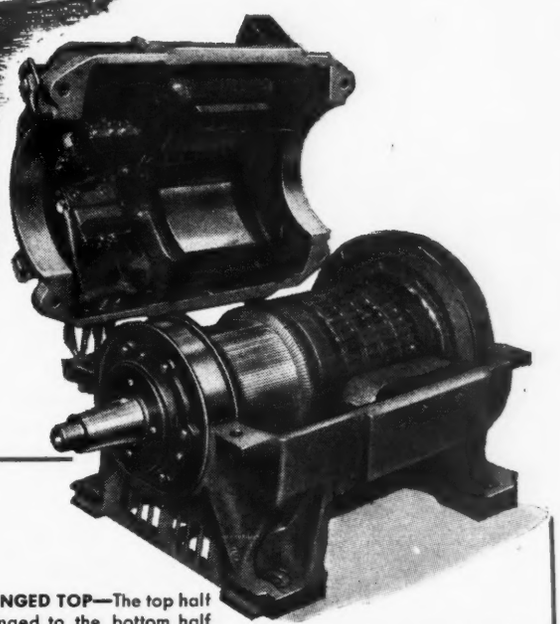
U·S·S American Rail Bonds

The Toughest G-E



Shovel Motor Ever Built

• Carries heavier loads safely
• Gives you more horsepower per frame
• Costs less to maintain



The new General Electric MD-600 shovel motor is the strongest, the best electrically balanced, and the most easily adapted shovel motor we have ever offered manufacturers and users of stripping shovels. Its new mechanical and electrical features will mean smoother shovel operation, less maintenance, and lower stripping costs.

The MD-600's frame is sturdier than that of any previous G-E design. The bearings are designed for a wider safety factor and greater capacity. Better commutations at all loads and speeds characterize this new motor. It is lighter and shorter and, most important, it gives you more horsepower per frame size, thanks to new design and insulating techniques.

The new MD-600 is one more good reason for specifying that your next stripping shovel be "General Electric equipped." Bulletin GEA-4654 gives all the details. It's yours for the asking. Write to *Apparatus Department, General Electric Company, Schenectady 5, N. Y.*

● **HINGED TOP**—The top half is hinged to the bottom half in frames 601 to 612 for easy inspection and repair of armature. Because of weight, heavier frames are split, but not hinged.

● **BEARINGS** — Single-width, solid cylindrical roller bearings are used in all sizes. All bearings are protected by dust-proof frameheads.

● **ARMATURE** — Low armature inertia (Wk^2) insures more horsepower output for the job. Lifting bails facilitate removal of the armature.

● **SHAFT**—The entire armature, with commutator, is assembled on a spider — a sleeve of seamless steel tubing or hollow-bored shafting — into which the shaft is pressed and keyed. Thus, the shaft can be pressed out without any disturbance to the commutator or winding.

● **FRAME**— Heavy cast-steel frame withstands severe service. It is equipped with lifting bails and with pads on both ends to mount a G-E brake.

● **BRUSH HOLDERS** — Box-type brush holders are used. All brush-holder supports are doweled and bolted, and are in a fixed position for reversible operation. Easy-to-remove plates and hinged frame make cleaning and repairing of brushes quick jobs.

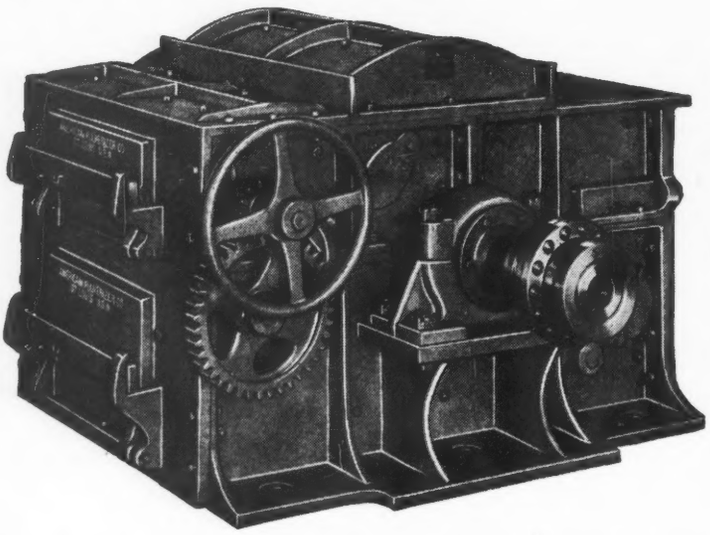
● **UNIVERSAL BEARING HOUSING**—Universal bearing housing accommodates all standard makes of roller bearings without special machining.

● **COILS**—All field coils are heavily insulated throughout with mica and glass. Armature coils are insulated with silicone-binder mica tape, with glass tape for over-all protection.

GENERAL ELECTRIC

867-58

PREPARE YOUR COAL FOR MORE PROFITABLE MARKETING

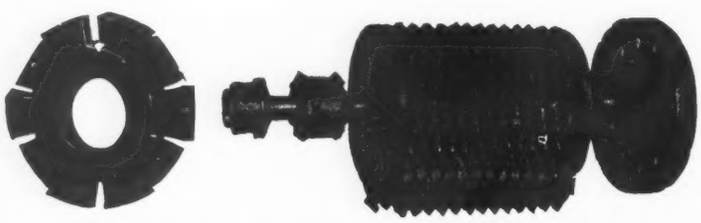


AMERICAN ROLLING RING CRUSHERS

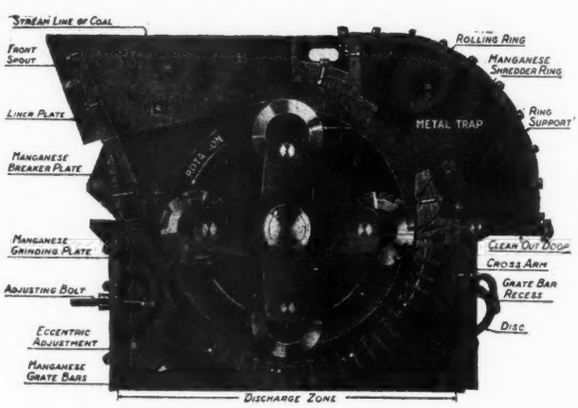
produce high tonnage with minimum fines and no oversize.

The American "AC" Type Rolling Ring Crusher is made in a simple and compact design with heavily ribbed cast side frames. Joints are machined for dust-tight fit. The sectional design makes for easy dismantling or inspection of the crushing chamber.

Easily marketable stoker and pulverizer sizes are profitably produced in American Rolling Ring Crushers. Through the splitting action of the patented shredder rings revolving at slower speeds, instead of the conventional crushing action at high speeds, sizing is held uniform in high tonnage production with a minimum of undesirable fines. Americans are doubly adjustable for great flexibility of sizing to meet seasonal requirements and market conditions. Americans are available in types to fit your operation . . . capacities from 50 to 500 TPH.



The twenty cutting edges on each of the manganese steel above rings and the many rings on the heavy rotor assembly above give high tonnage output at slow power-saving speeds with minimum fines. The cross section view at right shows how the shredder rings, revolving on individual shafts are free to deflect from tramp iron to give uninterrupted production and protect the crusher from injury. The easily cleaned metal trap catches and holds tramp iron.



Send for "AC" Bulletin on coal crushing data and crusher specifications.

American PULVERIZER COMPANY

Originators and Manufacturers of Ring Crushers and Pulverizers

1119 MACKLIND AVE.
ST. LOUIS 10, MO.

COAL STRIPPER'S *Money Maker*

By cutting waste and getting the last ton of pay which the coal vein can yield, *International Diesel Crawlers* add to your profits. Put a bulldozer-equipped International to work feeding scattered coal to your shovels. Watch your take from the pit increase and your mining time go down.

These power-packed crawlers serve the mines in other ways, too. They build access roads and hauling roads. They level spoil banks and walkways for draglines. And they even dig out the coal and feed it directly to chutes or hoppers.

Consult your International Industrial Power Distributor. Let him show you what an *International Crawler* can do for you. Get the facts about these Diesel-powered tractors—the proof of their superiority in the crawler tractor field.

INTERNATIONAL HARVESTER

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INTERNATIONAL *POWER*

CRAWLER AND WHEEL TRACTORS • DIESEL ENGINES • POWER UNITS

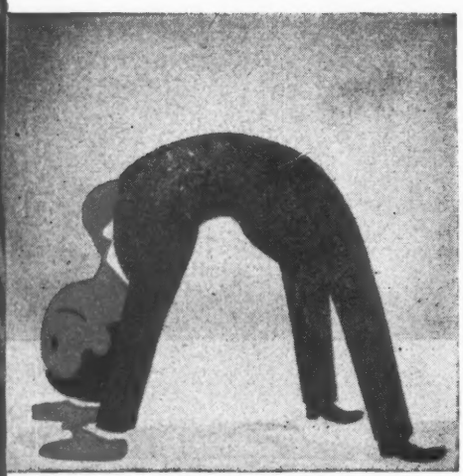
For Money In Your Pocket
PERFORMANCE ..

Resists Kinking

Being free from internal stress, it is always easy to handle—never fights back.

Spools Better

Even with a light load, it spools uniformly—is never cranky.



Takes Reverse Bends

Takes this "fatigue" much better, as on rope-ruining elevator installations.

Safer to Handle

Worn union-formed ropes handle as safely as new, as broken outer wires lie close to rope.

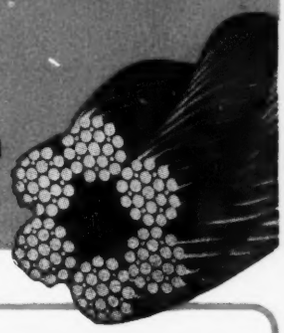
Always Relaxed

While it is flexible, and pliant, it has the "toughness" to withstand strain and weight.

Behaves on Grooves

Resists rotating or twisting in sheave grooves because wires are Preformed.

... Specify



union-formed
(preformed)

THE ULTIMATE IN LOW COST WIRE ROPE

Precision Constructed to OUTPERFORM *ordinary Wire Rope*

FIGHT! FIGHT! There is an exhausting fight going on all the time in ordinary wire rope, Each wire is fighting constantly to get out of the fixed position into which it is forced without any preliminary training to put it in shape. This internal fighting spoils the performance, cuts it short, doesn't give you a run for your money.

In **union-formed** Wire Rope each wire is put in shape (*Pre*formed) before it ever touches another wire in the rope. The result is exactly the same that comes from a set of conditioned muscles, i. e. finer coordination, greater endurance, top-flight kind of performance that does not let you feel out-of-pocket.

Yes sir! You will always get the most out of the best. The little extra you invest for the best is the part of your investment which will bring the payoff—yield the most dividends. Prove this fact to your own satisfaction. *Specify* **union-formed**—get money-in-your-pocket performance.

union Wire Rope

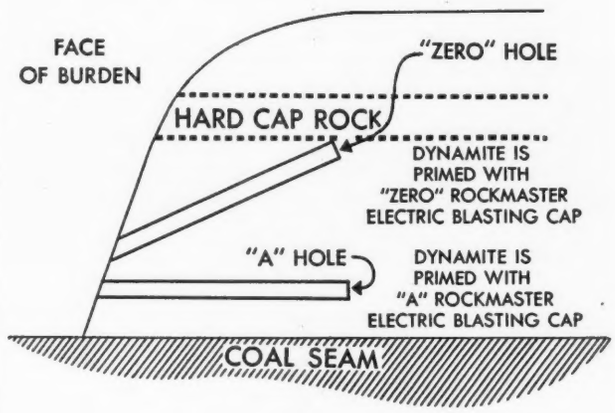
union Wire Rope

UNION WIRE ROPE CORPORATION

2130 Manchester Avenue Kansas City 3, Missouri

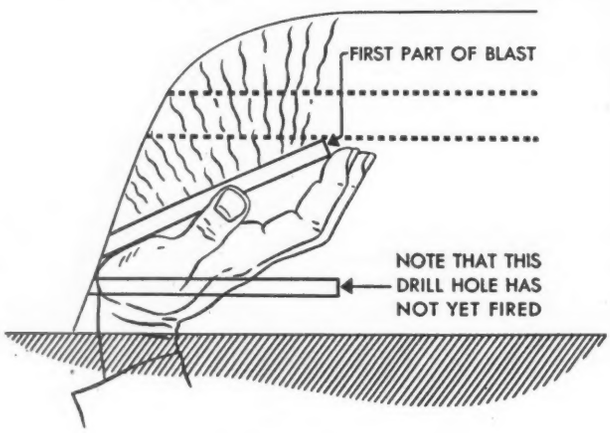
Tulsa 3 Houston 11 Chicago 6 Salt Lake City 13 New Orleans 16
Monahans, Tex. Portland 10, Ore. Ashland, Ky. Atlanta 1

How **ROCKMASTER** Smashes the Burden While It Cushions the Coal

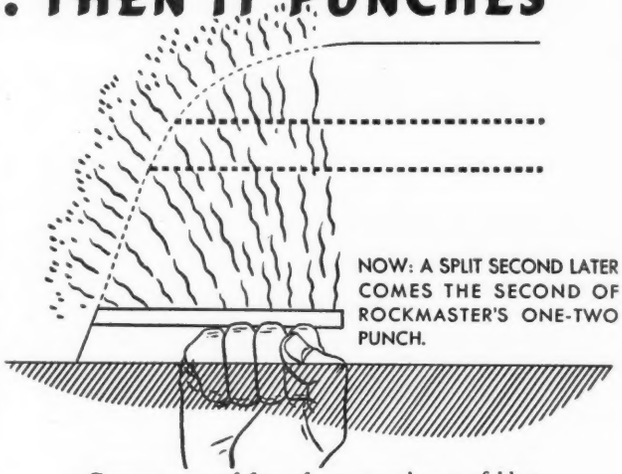


Cross section showing how drill holes are arranged for one type of Rockmaster blasting in strip pits where horizontal drill holes are used. Upward pitching holes are spaced between horizontal holes along the face.

FIRST...IT PUSHES ... THEN IT PUNCHES



In first part of blast, charge in "zero" hole lifts upper part of burden.



Greatest part of force from second part of blast acts toward newly developed "free" face, delivers another blow toward burden, thus helping save coal.

This method gives excellent throw and breakage of the over-burden and cuts down vibration under these conditions. Checking and cracking of the coal is minimized.

For consultation on problems involving the use of the Rockmaster system of blasting, write Atlas, originators of milli-second delay blasting.

"ROCKMASTER"—Trade Mark

ATLAS EXPLOSIVES

"Everything for Blasting"

CHEMICALS ATLAS EXPLOSIVES

ATLAS POWDER COMPANY, Wilmington 99, Del. • ***Offices in principal cities*** • ***Cable Address—Atpowco***

The Gulf Lubrication Engineer "in the picture" (second from right) is checking loader head lubrication in a prominent West Virginia mine.

You get practical help in solving problems like these —

- excessive wear in gears and bearings
- loss of lubricant through leakage
- lubricant throwoff or channeling
- abrasive coal dust in gear cases
- faulty lubrication under wet conditions

when the Gulf Lubrication Engineer is "in the picture":

THESE AND SIMILAR PROBLEMS have a marked influence on the cost of maintaining mining equipment. And even more important, they often result in costly breakdowns and reduced tonnage.

When you encounter troubles like these, it will pay you to consult with a Gulf Lubrication Engineer. You will get the advantage of specialized training and broad practical knowledge of the lubrication and maintenance of mining equipment. He can help you solve the most difficult lubrication problems by recommending the right Gulf lubricant and the most suitable method of application.

For further information on this helpful service, ask a Gulf Lubrication Engineer to call. Discuss your problems with him and ask him to make practical suggestions for improving your lubrication practice, reducing down time and maintenance costs in your mine. Write, wire, or phone your nearest Gulf office today.

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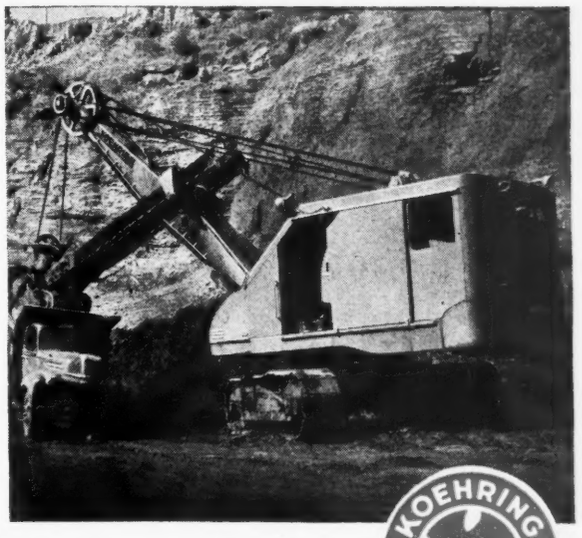
INVESTIGATE these
there are places where one

YOU'LL find both of these fast up-to-date units have the tough strength and stamina needed for modern mine and quarry operation. They are engineered and built to operate in tough ore and hard rock, over rough terrain and steep grades, on two and three shift operation. They cut down-time expense and delay headaches . . . they are easy to operate and simple to maintain.

DUMPTOR is a special 6-yard hauling unit for handling ore and rock. On hauls of 2000 feet or less it usually cuts hauling costs from 15 to 20%. It has constant mesh transmission, eliminates delay for shifting gears . . . it has forward speeds in reverse, can shuttle from shovel to dump, eliminates turning delay . . . it has instantaneous gravity dump, saves 10 to 20 seconds in unloading time every cycle. Investigate Koehring Dumptors . . . see your distributor today or write for literature.

The 605 is a 1½ yard, all modern, fully convertible mine and quarry excavator. You get full benefit of its up-to-date speed because it's easy to operate. The big clutches are power operated, take approximately one-tenth the pull of a manual clutch. Shovel boom is extra strong for digging rock and ore . . . has a strong wide shock-absorbing mount . . . carries shipper shaft on top to give extra strength in midsection. Investigate the Koehring 605 . . . get information now so you can check with other Koehring owners. At the same time, why not get literature on the smaller Koehring 205 and 304 companion excavators?

two STRIP PIT TOOLS
or both can save you money



KOEHRING 605

KOEHRING COMPANY Milwaukee 10, Wis.

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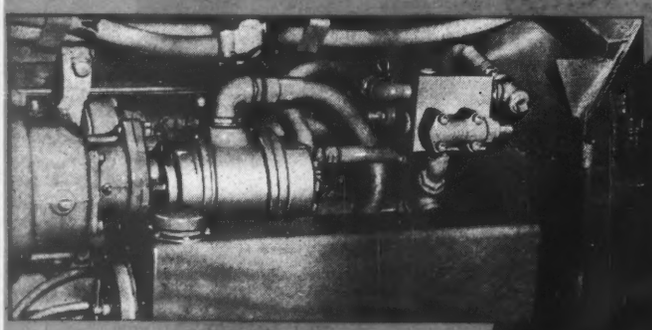
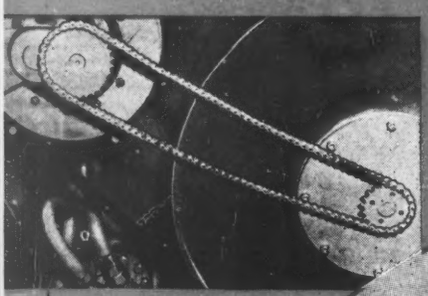
HYDRAULIC Cable Reel

Cable is automatically held in proper tension smoothly and constantly. Tension is relieved and reel reverses direction of rotation automatically at tie-in point. Hydraulic pump supplies ample power to reel motor, even at low voltages.





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JOY DIVISION

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WALWORTH LUBRICATED PLUG VALVES

offer these advantages

. . . Direct port opening

. . Quarter turn opens or closes valve

. . . Dead tight shut-off

. . . Freedom from attack by fluids being handled

. . . Pressure sealed

. . Made in a complete line. Sizes from ½" to 24" for pressures from 175 to 5,000 psi., and for vacuum requirements

THESE are just a few of the reasons why Walworth Lubricated Plug Valves give "top" performance on many *difficult* services.

All Walworth Lubricated Plug Valves employ special insoluble lubricants which protect the plug and body against contact with the line fluid, thus combatting erosion and corrosion.

The lapped surfaces of the valve are "pressure sealed" when the valve is in either the open or closed position. By turning the lubricant screw, lubricant is forced under high pressure through a grooving system that completely encircles the ports as well as the top and bottom of the plug.

The lubricant seals the valve against leakage, and reduces friction between plug and body. This permits easy, quick, full-opening, or tight shut-off with only a quarter turn of the plug.

Number 1700 (illustrated) is a Steel-iron valve, wrench operated, designed for a working pressure of 200 pounds WOG (water, oil, or gas). Valves are available in either screwed or flange types. Screwed type have API line pipe thread lengths. Flanged type (No. 1700F) is faced and drilled to American Standard for 125-pound cast iron flanges unless otherwise specified.

For further information about No. 1700 as well as the complete line of Walworth Lubricated Plug Valves, write for catalog.

WALWORTH

valves and fittings

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